THEME THREE:
PROTECTING OUR PLANET

UNIT THREE:
ENERGY AND FUEL



# Get Started What I Already Know

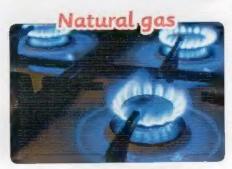


- During the first term of this year, you have learnt the meaning of energy and its relationship with work and movement.
   In this unit, we are going to learn more about energy and fuel.
- There are many forms of fuel that man uses in his daily life such as :

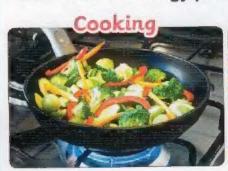








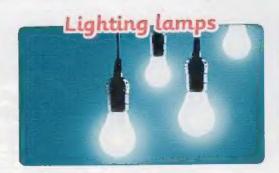
Man uses the energy produced from burning fuel in many purposes such as :







 Also, man uses the energy produced from burning fuel in generating electricity that is used in :





## In this unit we are going to study :

- Forms and types of fuel.
- Renewable and non-renewable resources of energy.
- The impact of using some energy resources on the environment.
- How can electrical energy be generated in electric power stations?
- The importance of using renewable resources of energy intead of non-renewable ones.
- Different uses of solar energy as a renewable resource of energy.
- Using wind and water to generate electricity.
- How can we conserve energy?

## • Unit Project : The Effect of Building Dams :

- At the end of this unit, you are going to do a research project about "Water" as one of the energy resources and how to use the kinetic energy in the flowing water of rivers to generate electrical energy by building dams on these rivers.
- You will also search for the effect of the construction of these dams on the surrounding environment.



Water dam

## • Interdisciplinary Project : The Bright side :

- At the end of this unit, you are going to create a model of a "Solar cooker" that uses the solar energy in sunny regions to cook food.
- You have to use the steps of the "Engineering
   Design process" that you have learnt in the
   previous educational grades to create your solar
   cooker model, then you have to test it and write
   some ideas to improve your solar cooker model.



Solar cooker

Concept 3.1

## **Devices and Energy**





## Learning outcomes

## By the end of this concept, your child will be able to:

- Develop models based on observations that describe how everyday devices transform energy.
- Use observations and evidence to explain how energy is transferred from place to place.

## Key vocabulary

- · Chemical energy
- Earth
- Energy resource
- · Energy conservation
- Energy transfer
- · Sound
- Sun

## Can You Explain?



The pictures above show some of the devices in which energy is converted.

- What types of energy transformations are required for sunlight to operate these devices?
  - Energy can be changed from one form to another.
  - Different devices can help us convert the light energy that comes from the Sun into different forms of energy.
  - Now, most devices depend on electricity, and to generate electricity, we can convert the energy of the Sun in different ways.
- In this concept, we will study:
  - Energy in toy cars that can be controlled remotely.
  - Mars exploration rover.
  - Energy chains.
  - Energy and devices that we use in everyday life.
  - Conservation of energy.
  - · Tracking of energy path.

## Notes for parents

Discuss with your child some devices that needs electricity to be operated.

## **Energy in Remote-Controlled Cars**

Look at the following pictures, then answer the question:
In which picture, can the child move the car remotely?



Picture (1)



Picture (2)

## Energy in remote-controlled cars

- Many toys such as cars, trucks, planes, and boats may be operated remotely.
- However, all of these toys need energy to move and perform activities like spinning in the corners and moving forward or backward remotely.



- In your opinion, how do those toys get energy?
  - Batteries inside these toys are the resource of chemical energy and this energy is converted into electrical energy which is converted into kinetic energy or sound energy.
- But, what do we do when the batteries of these toys run out?
  Batteries can be recharged by connecting the device to a nearby charger, or by replacing the old batteries with new ones.

## 111

## Check your understanding

- ► Complete the following sentences using the words below:

  (kinetic chemical electrical)
  - 1. The energy stored in batteries is ...... energy.
  - In remote-controlled toy batteries, chemical energy is converted into \_\_\_\_\_\_energy, which is converted into \_\_\_\_\_energy or sound energy.

11

<sup>·</sup> Discuss with your child the importance of batteries in operating some devices.

## Activity 3 **Mars Rover**

- Have you ever seen a picture of an exploration rover on Mars?
- This rover shown in the picture below needs energy to be operated, so it can explore Mars, have you thought about how it gets the energy it requires to be operated?

## Mars exploration rover

- Mars is about 54 million kilometers from Earth, so the spacecraft will take about six months to go that distance.
- In the last few years, man has sent many missions to Mars, all these missions had remotely operated vehicles or robots.



Mars Curiosity rover

- The "Mars rover Curiosity" which travels on the surface of Mars, is one of the most well-known of these robots.
- These robots, like remote-controlled toys, require energy to be operated, but the batteries used in the toys cannot be used in these robots as they are too distant from a store or charger plug on Earth.
- So, what is the resource of energy that Curiosity exploration rover needs to be operated?

The Curiosity exploration rover uses solar panels and batteries (which are charged by solar energy) as a resource of energy, where:

- The solar panels on the rover convert solar energy into electrical energy, which is used to charge the rover's batteries.
- The electrical energy from the batteries powers the vehicle's sensors and the electrical energy is also transformed into kinetic energy and thermal energy as the vehicle moves across Mars surface.



## Check your understanding

## Complete the following sentences using the words below:

(kinetic - electrical - solar)

 The solar panels on the Curiosity exploration rover convert energy into energy, which is converted into \_\_\_\_ and thermal energy.

## Notes for parents

Help your child read more about Mars rover Currosity from some online sources.

#### In the Exercises Book:

Try to answer:

• Exercises on Lesson (1) p.30

Self-Assessment (7)

# What Do You Already Know About Devices and Energy?

- ▶ Look at the following pictures, then answer the questions :
  - This toy car needs energy to move.



 The energy needed to run this fan is electrical energy.



Now, let's think about how different devices get energy to be operated.

## How does energy change (transform)?

Device	Consumed energy (input energy)	Produced energy (output energy)		
Hair dryer	Electrical energy.	Thermal energy and sound energy.		
Soap dispenser	Potential energy (stored in the spring of the soap dispenser).	Kinetic energy (the movement of the soap upward).		
Washing machine	Electrical energy.	Kinetic energy and sound energy.		

Let your child mention the input and output energies in some other devices.

## Note

When you rub your hands, you will feel warm because kinetic energy (consumed energy) is converted into thermal energy (produced energy).



## 1-1-1

## Check your understanding

## Look at the following pictures, then complete the table below:

Consumed energy	Produced energy
Chemical energy.	
	Sound energy and energy.
	andenergy
	Chemical energy.

## Notes for parents

Let your child answer the questions to check his/her understanding.

# Activity 5 Energy Chains

- You have learnt that most of the energy we use is made inside the Sun.
- In this activity, we will discover how energy is transmitted from its resource to the devices we use.

#### • Energy Chains:

- Energy chain is a way to describe or represent the energy flow that occurs when we use different devices.
- Energy chains often start with the Sun.
- Now, we will study some examples of energy chains.

## Energy chain when eating food

The Sun emits light energy that reaches a plant such as an orange tree.



The plant converts light energy comes from the Sun into chemical energy, which is stored in the form of sugars inside the plant.



When you eat an orange, your body converts the chemical energy stored inside the fruit into kinetic energy when your body move.







## The following diagram shows the energy chain in the previous example:

Light energy Converted into Chemical energy Converted into Kinetic energy

(From the Sun) (Stored inside the plant) (Movement of the human body)

. Discuss with your child the meaning of energy chains,

## Energy chain when heating a pot of water over a fire

Light energy comes from the Sun causes the growth of trees.



This light energy is converted into chemical energy which is stored in the form of sugars inside the trees.



When the wood of trees is burned, thermal energy is released which heats the water inside the pot.







▶ The following diagram shows the energy chain in the previous example :

Light energy

Converted into

Chemical energy

Converted

Thermal energy

(From the Sun)

(Stored inside the trees)

(When burning the wood of trees to heat the water inside the pot)

## Give reasons for:

1. You eat food then go for a walk, there is a change of energy takes place inside your body.

Because the chemical energy stored in the food is converted into kinetic energy that helps your body move.

2. There is a change of energy when burning some wood of trees.

Because the chemical energy stored inside the wood of trees is converted into thermal energy.

#### Notes for parents

- Discuss with your child the importance of the Sun as the main source of energy on the Earth.

## Energy chain in a hair dryer

Light energy from the Sun causes the growth of trees.





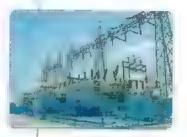
Coal is produced from the remains of dead trees over millions of years so, coal is a resource of energy that stores chemical energy.





## Coal is used in electric power stations, because :

- 1. When coal is burnt, it produces thermal energy.
- Then thermal energy is converted into k netic energy which is used to operate certain devices in these stations in order to generate electrical energy.





Electrical energy goes through electric copper wires until it reaches the hair dryer to be operated.



## The following diagram shows the energy chain in the previous example:

Light energy

Converted into

Chemical energy

Converted into

Thermal energy and kinetic energy

(From the Sun)

(In coal from the remains of dead trees)

(In electric power stations)

Converted

Thermal energy and sound energy

Converted into

Electrical energy

(In the hair dryer)

(Goes through electric wires)

He p your child read more about electric power stations from some online sources.

## **Notes**

- Not all the energy in the energy chain reaches the device.
- Some of the energy is lost (escape) while travelling through the energy chain, as
  it is converted into other forms of energy. This is because energy is not destroyed
  but it is converted into other forms of energy that the device does not use.
- Most of the lost energy leaks out in the form of heat.

## Check your understanding

Complete the following sentences using the words below:

(electrical - heat - chemical - coal - kinetic - Sun - thermal)

- 1. Most of the energy we use is produced inside the
- 2. When you eat, your body turns the energy found in the food into energy that helps your body move.
- 3. In electric power stations, is burnt to generate energy.
- 4. In an electric iron, electrica energy is converted into energy.
- 5. In several electrical devices, most of the lost energy leaks out in the form

### **Notes for parents**

Let your child answer the questions to check his/her understanding.

## **Energy and Everyday Devices**

- In this activity, you will use what you know about types of energy to describe the consumed energy and the produced energy in different devices.
- The following table shows the function, the energy consumed and the energy produced in some devices:

Device	Function	Consumed energy	Produced energy
Electric bulb	Lighting up	Electrical energy	Light energy and thermal energy
Battery powered clock	Showing the time	Chemical energy	Kinetic energy
Flashlight	Lighting up	Chemical energy	Light energy and thermal energy
Hand bell	Alerting	Kinetic energy	Sound energy
Electric heater	Warming	Electrical energy	Thermal energy

Let your child mention the consumed energy and the produced energy in some other devices.



## Write the suitable device number in front of each sentence:

A device which converts electrical energy into thermal energy only.



#### In the Exercises Book:

#### Try to answer

- Exercises on Lesson (2) p. 33
- Self-Assessment (8)

Notes for parents

Let your child answer the questions to check his/her understanding.

# Activity 7 The Conservation of Energy

- Look at the following pictures, then answer the questions:
  - In the kettle, electrical energy s converted into thermal energy.



 In the guitar, sound energy is converted into kinetic energy



- In the previous lesson, we have learnt that energy can be transformed from one form to another.
- Now, let's study some examples of energy transformation.

## Energy chain while riding a bike

When you eat, the chemical energy stored in the food provides your body with energy.



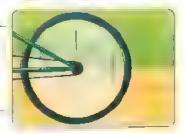
When you ride your bike and push the pedals, this chemical energy is converted into kinetic energy, which causes the bike to move.



Some of the kinetic energy, is converted into therma energy due to the tyre friction with the road.







Discuss with your child the energy transformation while riding a bike.

## The following diagram shows the energy chain of the previous example:

Chemical energy Converted into Kinetic energy Converted into Thermal energy (In the bike) Converted into Thermal energy (Tyre friction with the road)

## Energy chain when a light bulb is switched on

When you turn on a light bulb, the electrical energy that goes through the electrical wires is converted into light energy once it reaches the bulb.



2.

If you put your hand near the light bulb, you can feel heat comes out of the light bulb because some of the electrical energy is also converted into thermal energy.



## The following diagram shows the energy chain of the previous example:

Electrical energy Converted into Light energy and thermal energy

(In electrical wires) (In the light bulb)

From the previous examples, we can conclude that:

Energy can be changed from one form into another, where the new energy cannot be created from nothing, and the old energy does not disappear but it changes from one form of energy into another, this is called "the law of conservation of energy"

## The law of conservation of energy:

Energy can neither be created nor destroyed, but only converted from one form of energy into another.

## Notes for parents

- Discuss with your child the meaning of the law of conservation of energy

## Check your understanding

			و الماء	
Chat	(4)	OF		١.
rut	( 7 )	<b>U</b> 1		, .

	When you ride a bike, some of the kinetic energy is converted into thermal energy due to the tyre friction with the road.	(	)
	Electrical energy is converted into ight energy and sound energy when		
	a light bulb is switched on.	(	)
3.	The food we eat contains chemical energy.	(	)
4,	The electrical energy that enters a fan is not destroyed, but it is converted		
	into thermal energy.	(	)

#### in the Exercises Book:

Try to answer:

Exercises on Lesson 3 p 37

• Self-Assessment (9)

from rgy"

ot

Let your child answer the questions to check his/her understanding.



# Activity 8 Follow The Flow

## Look at the following picture, then answer the questions:



1. Is all of the energy that enters the mobile phone converted into light energy?





2. Does some of the energy in the mobile phone (cell phone) come out as sound energy?





E

- According to the law of conservation of energy, we know that energy is conserved and is neither created nor destroyed.
- All the energy that enters a device must finally come out of it, either in the same form or in other forms.
- All devices have energy coming in and out of them, where:
  - The energy that comes in a device is called "nput energy".
  - The energy that comes out a device is called "output energy".
- In this lesson, we will learn how the energy used to run a device is converted into other forms of energy, and where it flows.

## Emigy part tracking

 When we track the path of energy of any device, it looks like the device is losing energy, but the energy is actually being converted into another form, and some of the converted energy is not helping the device do its main function.

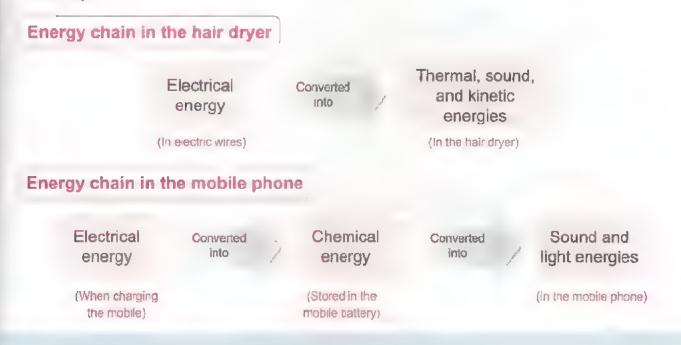
## Notes for parents

Help your child track the path of energy in some devices.

## ► The table below shows examples of input energy and output energy in some devices :

Device	Its function	Input energy	Output energy
Hair dryer	Drying hair.	Electrical energy (In electric wires).	<ul> <li>Thermal energy (Heat produced from the hair dryer).</li> <li>Sound energy (Sound produced from the hair dryer).</li> <li>Kinetic energy (Fan movement and airflow inside the hair dryer).</li> </ul>
Mobile phone	Ringing, Illuminating, and processing Information.	Electrical energy (When charging the mobile phone and this electrical energy is stored inside the battery as chemical energy).	<ul> <li>Light energy (Light produced from the mobile phone).</li> <li>Sound energy (Sound produced from the mobile phone).</li> </ul>

► The following diagrams show the energy flow chains of the previous examples:



Discuss with your child the meaning of wasted energy in some energy chains.

## **₽** Notes

- Noise from a hair dryer is considered as "wasted energy" because sound energy does not help the device do its main function.
- When using a mobile phone for a long time, some energy is wasted as thermal energy that does not help the device do its main functions.

## Check your understanding

## ▶ Put (✓) or (≯):

Put (4 ) of ( P).		
1. Some of the output energy does not always help the device do the func	ion	
for which it was designed.	(	)
<ol><li>The input energy in the hair dryer is chemical energy.</li></ol>	(	)
3. The output thermal energy from a hair dryer is considered wasted energy	JУ	
because it does not help the device do its main function.	(	)
4. The mobile phone stores electrical energy in its battery in the form of		
chemical energy.	(	)

## Notes for parents

## **Build an Energy Chain**

- In the previous lessons, you have learnt some examples of energy chains.
- Now, we will build an energy chain that shows the flow of energy starting with input energy and ending with output energy.

#### Light energy

Converted into



The Sun

## Chemical energy

Converted into



Coal

## Thermal energy and kinetic energy

Converted nto



Electric power station

## Electrical energy

Converted into



Electric wires

## Kinetic energy

(Energy which helps the biender do its job)

## Sound energy and thermal energy

(Energies which do not help the blender do its job)



Blender

Let your child form an energy chain to one of home electric devices.



Complete the following energy chain in a washing machine:

energy (from	the Sun)
Converted into	
energy (fro	m coal)
Converted into	
	operav
in electric power st	tations)
Converted into	
energy (in ele	ectric wires)
Converted into	
	energy and
energy	energy
Energy which helps the washing	(Energies which do not help t washing machine do its job)

In the Exercises Book :

Try to answer .

- Exercises on Lesson 4 p. 39
- Seif-Assessment (10)
- Model Exam on Concept (3.1)

## Notes for parents

Let your child answer the questions to check his/her understanding.

machine do its job)

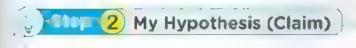


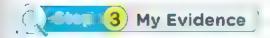
## Record Evidence Like A Scientist

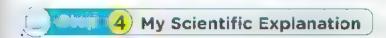
- In this concept, you have learnt a lot about energy and how different devices get the energy that they need to be operated.
- Now, try to think like a scientist by writing your hypothesis (claim), your evidence
  and your scientific explanation about one of the main points of this concept through
  the four steps you have learnt in the previous concepts.



What forms of energy transformations must occur for sunlight to operate a mobile phone?







## Optional Digital Activity

Activity (11) "Careers and Energy in Systems" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book

Help your child to think like a scientist by answering a cuestion about one of the main points of this concept, then
write his/her hypothesis, evidence and scientific explanation

## Review: Devices and Energy

- ▶ We can summarize this concept in the following main points :
- Batteries inside the remote-controlled toys are the source of chemical energy, as
  this energy is converted into electrical energy, which is converted into kinetic energy
  or sound energy.
- When the batteries run out of charge, they can be recharged by connecting the device to a nearby charger or by replacing the old batteries with new ones.
- Mars Curiosity rover uses solar panels and batteries (which are charged by solar energy) as a source of energy, where:
  - The solar panels on the rover convert solar energy into electrical energy, which is used to charge the rover's batteries.
  - The electrical energy from the batteries powers the vehicle's sensors and the electrical energy is also transformed into kinetic energy and thermal energy as the vehicle moves across Mars' surface.
- The table below shows the energy used and energy produced in some devices.

Device	Used energy	Produced energy
Washing machine	Electrical energy	Kinetic energy and sound energy
Electric heater	Electrical energy	Thermal energy

- Most of the energy we use is produced inside the Sun.
- Energy chain is a way to describe or represent the energy flow that occurs when we use different devices.
- Energy chains often start with the Sun.

## Example: Energy chain when heating a pot of water over a fire.

Light energy	Converted into	Chemical energy	Converted into	Thermal energy
(From the Sun)		( Stored inside the trees	)	(When burning the wood of trees to heat the water inside the pot)

 Some of the energy is lost in different forms, while travelling through the energy chain, where most of the lost energy leaks out in the form of heat.

## Example: Energy chain in a light bulb.

Electrical energy	Converted into	,	Light energy and thermal energy
(In electrical wires)			(In the light bulb)

### Notes for parents

Help your child review the main points in this concept.

## The law of conservation of energy:

Energy can neither be created nor destroyed, but only converted from one form of energy into another.

 All the energy that enters a device must finally come out of .t, either in the same form or in other forms. All devices have energy coming in them (called input energy) and coming out of them (called output energy).

## Example: Energy chain in the hair dryer.

Light energy	Converted into	Chemical energy	Conve		Thermal and netic energies	
(From the Sun)		(in coal from the rema of dead trees)	เกร	(In e	lectric power stations)	Converted into
	Thermal, sou		nverted Into	Electrica	l energy	
	( In the hair di	ryer)		Goes through	electric wres)	

When we track the energy flow of any device, we notice that sometimes the
converted energy does not help the device do the function for which it was
designed, such as the sound energy produced by the hair dryer in the previous
example.

# Concept 3 .2

# About Fuel





## Learning outcomes

## By the end of this concept, your child will be able to:

- Describe the patterns in how different types of fossil fuels are formed and predict the properties and uses of different types of fossil fuels.
- Describe how the use of energy and fuels affects on the environment.

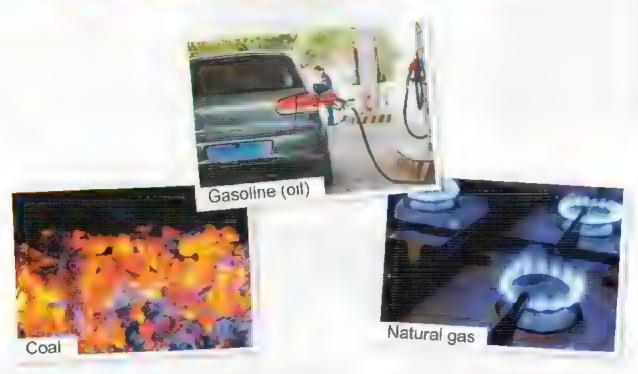
## Key vocabulary

- Energy efficiency
- Fossil fuels
- Fuels

- Non-renewable
- Renewable
- Generate
- · Renewab e energy resources
- Pollution



## Can You Explain?



- In the previous concept, you have learnt what energy chains are, how energy is transformed from one form to another and that the Sun is the main source of that energy.
- Is one of the most important resources of energy that humans depend on to get energy, so where does the fuel we use every day come from ?

  Fuel:

It is any substance that produces thermal energy when it is burned.

- From the previous explanation, we found that the main source of thermal energy that is produced by fuel, is the Sun.
- The pictures above show several forms of fuels that we use in our daily lives,
   where:

the underground and they are the most commonly used fuels in our lives as they are used in warming, running transportation and generating electricity.

## In this concept, we will study:

- Types of fuel.
- Fossil fuel formation.
- · Conserving fossil fuels.
- Oil and water.
- Using fossil fuels to generate electricity.

### Notes for parents

- Discuss with your child that any fuel must produce thermal energy when it is burned

## Fuels and Road Trips

Can cars move on roads when they run out of fuel?





2. Do cars need fuel to get energy to move?







 There must be fuel in the car to move again after it stops, where the fuel burns inside the car engine producing thermal energy that is converted into kinetic energy which causes the car to move.

## Read this story to learn why fuel is so important on road trips.

- One morning, Hany's family woke up and decided to travel to Alexandria to visit aunt Nora, who lives there. Hany, his mother and sister Samar got into the car.
- While driving down the highway Samar noticed that the gasoline pointer was close to zero and she said to her mother that the fuel was running out and she needed to stop at the nearest fuel station (gas station).
- Hany's mother drove to the nearest fuel station, where a station worker filled the tank and then she drove the car again.
- Hany asked his mother, "Why does a car need fuel to move?" She said the car needs fuel to move, so that the fuel burns inside the car engine, allowing the engine to rotate the wheels, so without the fuel, the car will not move.









## ▶ Put (√) or (★):

- 1. Cars need a source of energy to move.
- The fuel burns inside the car engine, allowing the engine to rotate the wheels. (
- Discuss with your child the importance of fuel in providing different means of transportation with energy to move



ity.

nergy

ource

in to get

ergy

lives.

d from they are



## What Do You Already Know About Fuels?

From the previous activities you have learnt that fuel is any substance produces thermal energy when it is burned. Among the several forms of fuel are:



Natural gas

Coal

Now, we will learn more about different forms of fuel and their uses.

## Uses of some different forms of fuel

Fuel is used for several purposes, such as :

- Cooking food, where coal, natural gas or wood may be used.
- Generating electricity, where oil, natural gas or coal may be used.
- (3) Warming, where coal or wood may be used.
- Operating all means of transportation, where gasoline (oil) or natural gas may be used.









## Notes for parents

Let your child mention some other uses of fuels in our daily life

- The thermal energy produced from the same form of fuel can be used for different purposes, as shown in the following two energy chains:
  - . The use of coal in cooking:

Light energy (from the Sun)

Chemical energy (stored inside coal)

Thermal energy (when burning the coal)

 The use of coal in generating e ectroity.

Light energy (from the Sun)



Chemical energy (stored inside coal)



Thermal and kinetic energies (in electric power stations)



Electrical energy (is transferred through electric wires)

Note

Gasoline is a fuel that is made from oil.



Complete the following sentences using these words:

(coal – thermal – gasoline – natural gas)

- 1. Fuel is used as a source of ..... energy.
- 2. Burning of ...... or ..... allows cars to move.
- 3. Natural gas and are used as resources of thermal energy for cooking food.

In the Exercises Book:

Try to answer:

- Exercises on Lesson (1) p. 42
- Self-Assessment (11)

Let your child answer the questions to check his/her understanding



# Activity 4 Types of Fuel

▶ The following pictures show several forms of fuel. Complete the following sentences using the words below pictures (you may use one word more than one time).



1. From forms of fuel that are used in cooking food are

- Of
- From forms of fuel that are used in generating electricity are or
- 3. From forms of fuel that are used in operating all means of transportation are or
- In the previous lesson, you have learnt that fuel is one of the most important resources of energy and these resources are divided into:

#### Non-renewable energy resources Renewable energy resources They are natural resources that are used They are natural resources that can be at a rate faster than they can be replaced, replaced after a short period of time of such as coal, natural gas and oil. use, such as water, solar energy and wind energy. Non-renewable energy resources are Renewable energy resources are those those that run out when consumed that continually renew or replace the (used) and cannot be renewed in a part that has been consumed (used), so short period of time. they will not run out.

#### Notes for parents

Biscuss with your child theid fference and examples of renewable and non renewable energy resources

### Types of fuel can be classified into:

- 1) Biofuel
- '2 Fossil fuel

ollowing [

Biofuel

#### Biofuel:

It is a fuel that is produced from living organisms that can be planted (i.e., plants).

▶ Biofuel is a renewable energy resource that is continually renewed as plants grow, so it is known as "renewable fuel".

ts primary source: The Sun

### Examples:

 Wood is the oldest fuel that is still used all around the world in warming and cooking food.



Charcoal is made from wood and it is one of the most important forms of fuel.



are

3. Some types of plants such as grass, corn and wood chips can be used to make a ..qu.c fuel



st nto:

#### onservation of biofuel:

Although biofuel is a renewable energy resource, it should be conserved [rationalized], where:

at are used re replaced oil.

sources

Using wood as a source of energy requires cutting down trees.

Rapid cutting cown trees (known as "deforestation"), causes negative effects on the environment.

Therefore, the wood we use should be continuously rationalized, so that it will not run out.

urces are sumed ed in a

#### Note

Many trees grow a few centimeters each year, while some trees reach their full height in a period nearly equals the human's lifetime. This means that the growth of these trees takes more than one human's lifetime to complete their growth.

- Discuss with your child the meaning of biofuels and how to conserve them



#### Fossil fuel:

It is a fuel that is produced from old living organisms (plants or animals) that were buried and decomposed over a long period of time.

▶ Fossil fuel is a non-renewable energy resource, because once it is consumed, it runs out faster than it can be renewed.

## its primary source: The Sun

### **Examples:**

- Oil and natural gas are formed when the remains of marine organisms (sea animals) were decomposed.
- 2. Coal is formed when the remains of plants were decomposed.





#### Formation of coal:

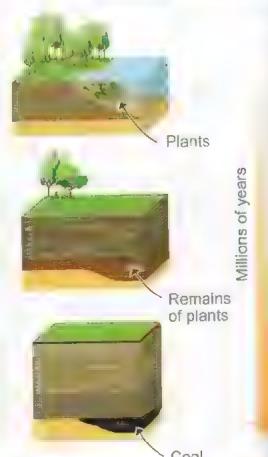
300 million years ago, large areas of the Earth were covered with swamps, with a lot of plants growing nearby.



When those plants died, their remains were decomposed and covered by hundreds of metres of mud and rocks.



Due to the effect of extreme heat and pressure, those remains were turned into **coal** 



#### Notes for parents

Discuss with your child the meaning of fossil fuels and their formation

#### Conservation of fossil fuel:

- Non-renewable fossil fuels should be conserved and alternative resources should be found as:
- Fossil fuels (coal, oil and natural gas) take millions of years to be formed, as they
  are consumed faster than they are formed. Once they are used, they start to run out
  because they can't be easily renewed.



► Complete the following table using these words :

(living organisms – grass – renewable – oil – corn – пол-renewable – the Sun – millions of years – coal )

Points of comparison	Biofuel	Fossil fuel
Definition :	It is a type of fuel that is formed from that can be planted.	It is a type of fuel that is formed from the remains of living organisms, where it takes to be formed under certain conditions.
Primary source :	placements down attached to place down the tendent that the period	The Sun.
Renewable or non-renewable :		
Examples:	Wood, and	Natural gas, andand



#### **Optional Digital Activity**

Activity (5) "Fossil fuels" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

<sup>.</sup> Discuss with your child how to conserve fossi, fuels.

# Activity 6 Oil and Water

- Oil and water are considered from resources that are used by humans to generate energy.
- · Oil has a structure differs from that of water.
- Oil is a non-renewable energy resource, while water is a renewable energy resource.

#### Formation of oil:

 Oil is extracted from the underground as a result of decomposition of marine organisms, where:

When those marine organisms died, their remains settle on the ocean floor.



Over millions of years, layers of sediments and rocks cover the remains of those marine organisms, this results in extreme heat and pressure.



Over time, as a result of extreme heat and pressure, those remains converted into oil.

#### Conservation of oil:

- Oil is consumed at a rate greater and faster than the production of new oil, so it should be rationalized in order to avoid running out through many ways such as:
  - 1. Reducing the use of private vehicles.
  - 2. Using of public means of transportation.

#### Conservation of water:

- ▶ People should use water carefully and rationalize its using through many ways such as :
  - Avoid wasting or polluting water, because we may not be able to replace it as quickly as we need.
  - Growing plants that do not need large amounts of water for irrigation.





#### Notes for parents

· Discuss with your child how oil is formed and how to conserve it.



erate

Complete the following sentences:

urce.

1 Over time, the remains of marine organisms are converted into as a result of extreme heat and

2 Oil is a energy resource while water is a energy resource.

3. Using of and reducing the use of are from ways that conserve oil.

4. Oil is extracted from as a result of decomposition of

In the Exercises Book:

Try to answer

Exercises on Lesson (2) p 45

Self-Assessment (12)



Let your child answer the questions to check his/her understanding

# Activity 7 Fassi Funt Formation

## Arrange the following steps to know how the fossil fuel is formed:

The remains of marine living organisms were buried and decomposed under sediments and rocks.

Remains of marine a living organisms



Due to the effect of extreme heat and pressure, the remains of marine living organisms were turned into oil or natural gas.



Oil or natural gas

The death of marine living organisms that have lived since ancient times.



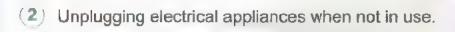
Dead marine living organisms

#### Notes for parents

Let your child arrange the steps of fossil fuel formation

# **Living Without Electricity**

- From the previous lessons, you have learnt that fossil fuels are non-renewable energy resources which are used to generate electrical energy, where, natural gas and oil are used to generate electricity in many regions, so they should be conserved.
- Renewable energy resources such as hydroelectric energy (from waterfalls and dams) and wind energy are also used to generate electricity.
- Whatever the resource of energy is renewable or non-renewable, we should conserve the energy through many ways such as :
  - 1) Turning off lights when they are not needed.





- Imagine the electric current being cut off while you were studying, you can use simple ways to keep studying, like:
  - 1. Using candles instead of the electric lamps.
  - 2. Writing with a pen and paper instead of using a computer.
- From the above example, we conclude that **electrical energy** is very important in our lives and should be conserved.

# Check your understanding

► Look at the following pictures and then put (✓) in front of the picture showing how to conserve electricity.







Discuss with your child how to conserve the using of electricity

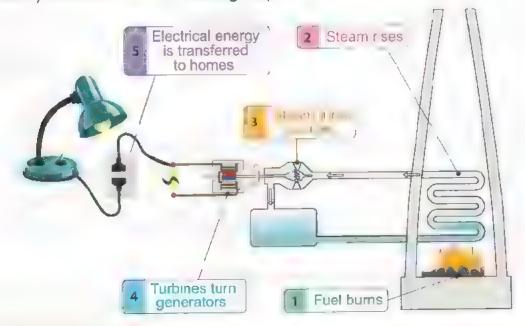
## Activity 9

# Using Fassil Fuels to Generate Electricity

- As you knew from the previous lessons that fossil fuels have many uses including:
  - 1. The use of gasoline and natural gas to operate cars.
  - 2. The use of oil, coal and natural gas to generate electricity.
- Now, we will study how fossil fuel can be used to generate electricity, which is used to light homes.

#### How fossil fuel is used to produce electricity

To generate electricity, fossil fuel is burned at the electric power stations (power plants) as shown in the following steps:



1 Fuel burns

When fuel burns, it produces thermal energy.

2 Steam rises

This thermal energy is used to heat water producing steam.

(3) Steam turns turbines

The steam goes inside tubes to be used to operate devices called "turbines".

#### Notes for parents

· Help your child read more about generating electricity in electric power stations from some on the sources



#### 4) Turbines turn generators

- The movement of turb nes produces kinetic energy, which is used to operate the generator.
- When the generator is turned on, it converts the kinetic energy into electrical energy.

used

### 5 Electrical energy is transferred to homes

Finally, the electrical energy is transferred through cables (wires) to homes to operate different devices.



- ▶ Complete the following sentences:
  - 1. When fossil fuel burns, it produces energy.
  - In the electric power stations, the thermal energy that is produced from burning fossil fuel is used to heat water to form
  - 3. In the electric power stations, there is a device known as that is used to convert the kinetic energy into electrical energy.

In the Exercises Book:

Try to answer

- Exercises on Lesson (3) p. 49
- Self Assessment (13)

Let your child answer the questions to check his/her understanding

# Activity 10

# **Big City Environmental Concerns**

▶ Put (✓) in front of the picture that shows environmental pollution :







- From the previous lessons, you have learnt that fossil fuels have negative effects on the environment.
- In this lesson, we will study that fossil fuels have many bad effects in big cities, where the increase of people's needs and their industrial and agricultural activities cause pollution problems around the world.

#### Some sources of politition in big cities

- Burning fuel produces smog, which pollutes the a r.
- Pesticides used on farms are mixed with water

  in canals and rivers when rain falls, this lead to
  pollution of soil and water.
- Using chemicals in factories pollute the air and also the nearby water sources and soil.







# Some effects (impacts) of air pollution on human's health

- Smog from cars cause irritation of human's eyes and lungs.
- Scientists have found that smog contains tiny particles that the human breathes in, these particles imitate the lungs, causing the damage of tissues of the respiratory system.

#### Notes for parents

· Discuss with your child the sources of air pollution that causes many harmful effects on human's health,

#### **₽** Note

Countries should make a greater effort to set laws to prevent high levels of smog in big cities.



# Check your understanding

#### Complete the following sentences:

- 1. Smog from cars cause irritation of human's and
- 2. When used on farms are mixed with water in canals and rivers when rain falls, this lead to pollution of soil and water.
- 3. Burning fuel produces .... which pollutes the



es,

vities









athes in, iratory

Let your child answer the questions to check his -

#### **Activity** 11

# Burning Fossil Fuels and Pollution

- In the previous lessons, you have learnt that extracting fossil fuel from the underground harms the environment and when burning this fuel to generate electrical energy, this pollutes the environment.
- People need energy to operate trains, cars and ships, and even more energy is needed to supply houses, schools and factories with electricity.
- To get this energy, the solution was to extract and use fossil fuels to generate electrical energy, where:
- Coal, oil or natural gas is burned at electric power stations and the energy produced from burning fuel is used to generate electricity.
- Then, the generated electricity is transferred to different places through electric wires.



#### Huma of burning of fossil facts on the environment

Burning fuel not only produces electricity but also pollutes the environment, where burning of coal and oi produces carbon dioxide gas which causes:



#### Acid rains

Carbon dioxide gas combines with water in the air to form <u>carbonic acid</u>, resulting in acid rains that <u>cause</u>:

- The death of trees.
- Decomposition and dissolving of some rocks including bricks of buildings.
- Chemical changes in the structure of lakes causing the death of fish.
- Chemical changes in the structure of soil.

#### Global warming

Increasing the amount of carbon dioxide gas in the air forms a layer in the atmosphere that traps heat above the Earth's surface causing a slow rise in the Earth's temperature, which is known as global warming.

#### Notes for parents

• Discuss with your child the reasons and the bad effects of both acid rains and global warming.

#### How to reduce acid rains and global warming

- The best solution to reduce acid rains and global warming is to rationalize (decrease) the use of energy, where:
  - As we reduce our consumption of energy, the amount of burning of fossil fuel to generate energy decreases.
  - As the amount of burning of fossil fuel decreases, the amount of carbon dioxide and other pollutants in the air which we breathe in will decrease.

#### **₽** Note

Decreasing the use of energy not only reduces pollution but it also conserves non-renewable fossil fuels and keeps the Earth planet clean.

# Check your understanding

"Fossil fuels cause air and water pollution".
Based on this statement, complete the following sentences using these words:

(carbon dioxide – temperature – chemical – atmosphere – carbonic – rocks)

# The burning of fossil fuel causes

Effect

Spread of ..... and water vapour in the air.

Climate changes

Spread of harmful gases which combine with water in the air to form . . . . acid.

changes in the structure of lakes and the decomposition of

The increase of carbon dioxide in the air forming a layer in the ............

Increasing the Earth's

In the Exercises Book

Try to answer:

- Exercises on Lesson 4 p. 54
- Self-Assessment (14)



 dioxide

e the se in the

Let your child answer the questions to check his/her understanding.



# Activity 12 Conserving Fessil Fuels

#### ▶ Look at these pictures, then answer:

• Is fossil fuel used to cook food?



 Is fossil fuel used to generate electricity to light homes?



- From the previous lessons, you have learnt that how fossil fuels burn to generate electricity that lights our homes, so we should conserve this type of fuel, where:
  - There is a limited amount of fossil fuels available on the Earth.
  - Fossil fuels are formed over millions of years, this means what we use cannot be replaced as quickly as it is consumed.
  - Fossil fuels are considered non-renewable natural resources of energy that will run out from the Earth if consumption is not rationalized.

#### Some methods of conserving tossil fuels



 Walking or using bicycles instead of driving a car.



Turning off the lights when you are not in the room.



3. Replacing fossil fuels with renewable energy resources such as: solar energy, hydroelectric energy and wind energy.

#### Notes for parents

Let your child mention some other ways to conserve fossil fuels.

#### Birmidrantogen of militar familificate in image production

- The amount of fossil fuels is limited and could run out.
- When some forms of fossil fuels burn, they emit gases that cause :
  - Air pollution.
  - Trap heat in the atmosphere, which raises the temperature of Earth planet and changes its climate. This phenomenon is known as "global warming."



The use of renewable energy resources instead of fossil fuels means that renewable energy resources will not run out and so this will not cause an increase in Earth's temperature but production of energy by using renewable energy resources is more expensive than using fossil fuels.

#### his type $\triangleright$ Put ( $\checkmark$ ) or ( $\gt$ ):

1. The amount of fossil fuel on Earth planet is unlimited.	(	,
2. Producing energy from renewable resources is less expensive		
than producing energy from fossil fuels.	(	)
<ol><li>Using cars instead of bicycles is one way to conserve fossil fuels.</li></ol>	(	)
4. The gases emitted by the burning of fossil fuels pollute the environment	ent. (	١

innot be

nat will



#### **Optional Digital Activity**

Activity (13) " The value of renewable resources" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

i fueis energy as : solar lectric nd energy.

Let your child answer the questions to check his/her understanding.

# Activity 14 Using Fuel

- ▶ From the previous lessons, you have learnt about types of fuels, their forms and their uses, and you also have learnt that different forms of fuels can be renewable or non-renewable energy resources.
- From what you have learnt, classify the following renewable energy resources and non-renewable energy resources in the following table using these words:

(Charcoal – Gasoline – Oil – Solar energy – Natural gas – Wind energy – Wood)

Renewable energy resources	Non-renewable energy resources
	Coal
Water	
	Kerosene (one of oil products)



#### ▶ Give reasons for :

- 1. Water is considered as a renewable energy resource.
- 2 Coal is considered as a non-renewable energy resource.

In the Exercises Book:

#### Try to answer

- Exercises on Lesson (5) p 58
- Self-Assessment (15)
- Mode Exam on Concept (3.2)

#### Notes for parents

Let your child answer the questions to check his/her understanding



:ls

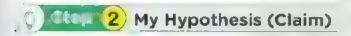
#### Activity 15

# Record Evidence Like A Scientist

- In this concept, you have learnt a lot about some types of fuels, their forms and their uses.
- Now, try to think like a scientist by writing your hypothesis (claim), your evidence
  and your scientific explanation about one of the main points of this concept through
  the four steps you have learnt in the previous concepts.



Where does the fuel we use every day come from?









p 58

#### **Optional Digital Activity**

Activity (16) "Oil drillers and underwater robots" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

<sup>•</sup> Help your child to think like a scientist by answering a question about one of the main points of this concept, then write his/her hypothesis, evidence and scientific explanation.

## Activity 17

# Review: About Fuel

 Fuel is one of the most important resources of energy that humans depend on to get energy.

#### Fuel:

It is any substance that produces thermal energy when it is burned.

The main source of thermal energy that is produced by fuel, is the Sun.

#### Different forms of fuels:

Oil – natural gas – coal – wood.

#### Uses of some different forms of fuels:

- 1 Cooking food, where coal, natural gas or wood may be used.
- 2 Generating electricity, where oil, natural gas or coal may be used.
- 3. Warming, where coal or wood may be used.
- 4 Operating all means of transportation, where gasoline (oil) or natural gas may be used.

#### Energy resources

#### 1. Renewable energy resources:

 They are natural resources that can be replaced after a short period of time of use, such as water, solar energy and wind energy.

#### 2. Non-renewable energy resources:

 They are natural resources that are used at a rate faster than they can be replaced, such as coal, natural gas and oil.

#### Types of fuels

- Biofuel: It is a fuel that is produced from living organisms that can be planted.
  - Its primary source: The Sun.
  - Biofuel is a renewable energy resource.

#### Examples:

Wood

- Charcoal
- Some types of plants such as grass corn and wood chips can be used to make a liquid fuel.

#### Notes for parents

· He.p your child review the main points in this concept

- 2. Fossil fuel: It is a fuel that is produced from old living organisms (plants or animals) that were buried and decomposed over a long period of time.
  - Its primary source: The Sun.
  - Fossil fuel is a non-renewable energy resource.

#### Examples:

- Oil and nat ral gas are formed when the remains of marine organisms were decomposed.
- Coar is formed when the remains of plants were decomposed.

#### Conservation of oil

- · Reducing the use of private vehicles.
- · Using of public means of transportation.

#### Conservation of water

- Avoid wasting or polluting water.
- Growing plants that don't need large amounts of water for irrigation.

#### Conservation of electricity

- Turning off lights when they are not needed.
- Unplugging electrical appliances when not in use.
- Burning of coal and oil produces carbon dioxide gas which causes :
  - Acid rains.

Global warming.

#### Acid rains cause :

- Death of trees.
- Decomposition and dissolving of some rocks.
- Chemical changes in the structure of lakes causing the death of fish.
- Chemical changes in the structure of soil.

#### Global warming :

- Increasing the amount of carbon dioxide gas in the air causing increasing the temperature of the Earth's surface.

#### Conservation of tossil fuels

- Turning off lights when you are not in the room.
- Walking or using bicycles instead of driving a car.
- Replacing fossil fuels with renewable energy resources such as solar energy, hydroelectric energy and wind energy.

ρf

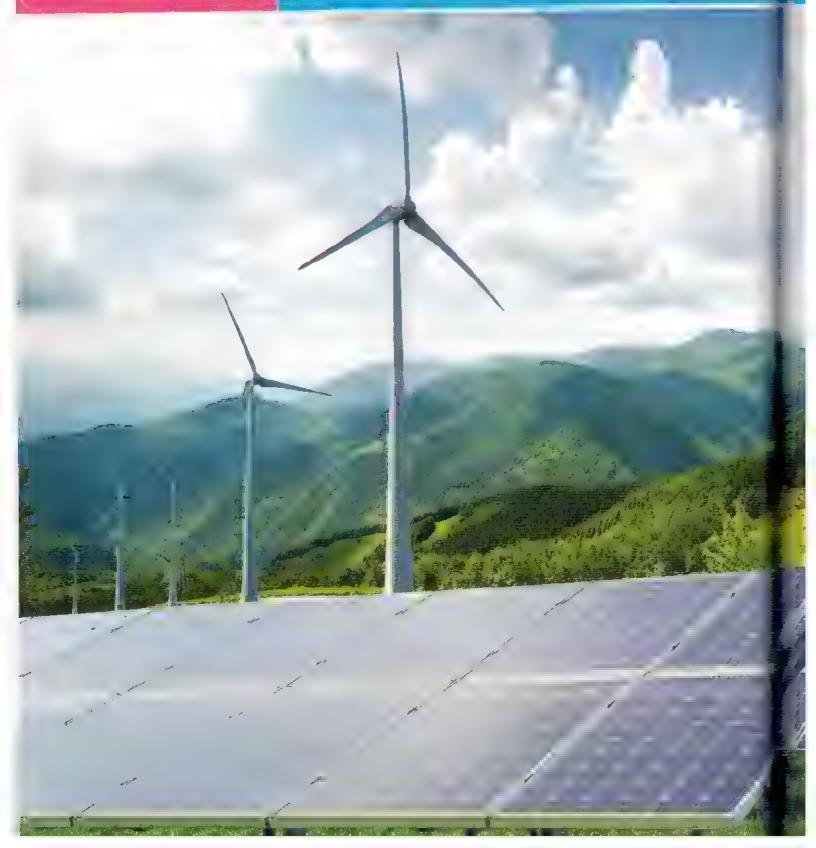
Эy

d.

ake

Concept 3

# Renewable Energy Resources





## Learning outcomes

#### By the end of this concept, your child will be able to:

- Apply scientific ideas to design, test and refine devices that convert energy from one form to another.
- Explain the use of renewable energy resources in the generation of electricity.
- Develop models based on observation and evidence that energy is transferred from place to place.

## Key vocabulary

- Heat
- Light
- Radiation
- Solar energy

- Turbine
- Watermills
- Windmills



# Activity 1

# Can You Explain



## What are the various methods for generating electricity from renewable energy resources?

- From the previous pictures, we notice that the examples of renewable energy resources include:
  - Solar energy (sunlight), wind and water.
- Electricity can be generated using the previous renewable energy resources in different ways, where:
  - Solar panels use solar energy to generate electricity which is used to light streets.
  - Windmill turbines generate electricity by using the kinetic energy of wind.
  - Waterm II turbines generate electricity by using the kinetic energy of water.

#### In this concept, we will study:

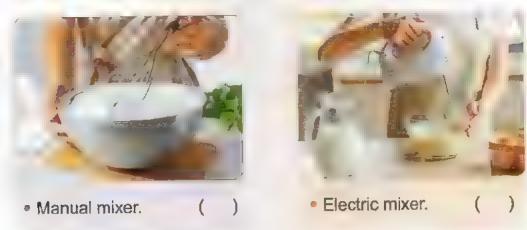
- · Windmills and watermills.
- Renewable energy resources.
- The Sun and the use of solar energy.
- Ways to generate useful energy using the wind movement.
- Ways to generate electricity using the kinetic energy of water.

#### Notes for parents

Help your child read more about generating electricity from some online sources

## Windmills and Watermills

▶ Put (✓) in front of the device that is operated with electricity:



- You know that most of the devices around us need electricity to be operated, but how did humans use devices hundreds of years ago before electricity?

#### Windmills and watermills

- Hundreds of years ago, people needed machines to make their lives easier, for example, they used windmills and watermills which helped them to grind grain to make flour.
- The following table shows the energy used in windmills and watermills as well as the advantages and disadvantages of each:

Points of comparison	Windmills	Watermills
Energy used :	The wind movement generates kinetic energy which moves the mill's blades, then kinetic energy goes to other parts of the mill to grind the grain.	The water movement generates kinetic energy which moves the mill's blades, then kinetic energy goes to other parts of the mill to grind the grain.
Advantages :	<ul> <li>Low cost.</li> <li>Renewable energy resource.</li> </ul>	<ul><li>Low cost.</li><li>Renewable energy resource.</li></ul>
Disadvantages :	Sometimes the wind does not blow and the windmills do not move, so they are unable to do their job.	The water supply may dry up and the watermills do not move, so they are unable to do their job.

Discuss with your child how windmills and watermills can be used to generate electricity

#### **₽** Note

Modern wind turbines and old windmills vary in shape and number of blades, but both are used to generate electricity.



Modern wind turbines



Old windmills

# 下11

## Check your understanding

#### ▶ Put (√) or (≯):

- Hundreds of years ago, people used windmills and watermills to grind grain to make flour.
   All mills depend on the kinetic energy of wind only in order to be operated.
- 4. The kinetic energy of water is responsible for the movement of windmills. ( )

3. From the advantages of windmills and watermills is that they are low cost. (

#### Notes for parents

Let your child answer the questions to check his/her understanding.

# What Do You Already Know About Renewable Energy Resources?

- You have known that any device we use needs energy to be operated.
- . The following table shows examples of renewable and non-renewable energy resources :

Energy resource	Renewable or Non-renewable	Example
Battery	Non-renewable	Flashlight
Gasoline	Non-renewable	Car engine
Solar panels (sunlight)	Renewable	Lighting lamps
Coal used in electric power stations	Non-renewable	Fan
Natural gas	Non-renewable	Stove

<sup>\*</sup> Let your child mention other devices and the type of energy used to operate them.



Write in the table below whether the following energy resources are renewable or non-renewable:

Energy resource	Renewable or Non-renewable
Electricity generated by windmills.	
Gasoline.	
Electricity generated by water turbines.	
Coal.	
Natural gas.	

In the Exercises Book:

Try to answer

• Exercises on Lesson 1 p. 62

- Self-Assessment (16)

Let your child answer the questions to check his/her understanding.



# Activity 4 The Sun

#### ► Look at the following pictures, then put (✓ ) or (⊁):





Plant (1) (In a dark room)

Plant (2) (In a lighted room)

- 1. Plants require water only to grow.
- 2. Plant (1) requires sunlight in order to grow.
- 3. Green leaves of plant (2) will turn yellow.
- You have learnt that the Sun is a source of light and it comes at the start of the energy chains.
- Let's know how the Sun is important to keep life on Earth.
- The Sun provides us with light and neat.
- Plants need sunlight to grow and without the Sun, plants would not be able to survive, so they will die and the animals that eat them will die, too, so life on Earth will disappear.

# The diam

- The Sun is a star and like all stars, it is made up of gases (mostly hydrogen and helium gases).
- The Sun does not have a hard surface like the moon, but it has a surface known as the "photosphere".
- The photosphere is the gas layer at the surface of the Sun, where the light we see is emitted.



The photosphere of the Sun

Discuss with your child line structure of the Sun and also its importance for living organisms.

#### How does the Sun produce light and heat?

- The energy of the Sun comes when hydrogen and helium gases in the Sun react at very high temperatures, producing huge amounts of light and heat.
- Light and heat travel through space in the form of waves, some of these waves reach the Earth.

#### **♥** Note

Do not look directly at the Sun as its rays are too strong and can harm your eyes.



#### - IN - IN - IN

# Check your understanding

## > Complete the following sentences using the words below:

(light - hydrogen - waves - heat - photosphere - helium)

- 1. The Sun is made up of gases mostly \_\_\_\_ and \_\_\_\_ and \_\_\_\_
- 2. Huge amounts of and are produced when hydrogen and helium gases react at very high temperatures.
- 3.Light and heat from the Sun travel through space in the form of that reach the Earth.
- 4. The gas layer at the surface of the Sun where the light we see is emitted is called the ...

#### Notes for parents

<sup>·</sup> Let your child answer the questions to check his/her understanding

# **Using Energy From the Sun**

- In the previous activity, you have learnt how the Sun is important to living organisms, as most plants and animals need the Sun to survive.
- Now, let's know how the energy of the Sun reaches us on Earth and how we use it in our daily life.
- · At night when the Sun is not visible in the sky, you can feel warm because :
  - The atmosphere absorbs the energy of the Sun.
  - Land and water on Earth's surface absorb the energy of the Sun, which causes a rise in the Earth's temperature.

#### Solar energy

- The energy comes from the Sun is called 'so ar energy", which is radiant light and heat from the Sun.
- The solar energy that is produced by the Sun contains a type of energy called "radiant energy" (radiation) which is found in the Sun rays.

#### Uses of solar energy

#### Direct source of thermal energy

Solar energy can be used directly as a source of thermal energy when exposing yourself to the Sun to feel warm.

#### In greenhouses

Where, greenhouses allow the entry of solar energy (especially radiant energy) that comes from the Sun, then this radiant energy is converted into thermal energy that warms the inside of the greenhouses, which helps farmers to plant the crops that only grow in warm climates.



#### In warming houses

Where, houses can be built in a way that enables the energy of the Sun to warm them by placing large windows on the walls that face the Sun for most of the day.



<sup>·</sup> Discuss with your child the different uses of solar energy

#### In cooking food

Where, curved mirrors are used to collect and focus Sun rays to heat metal pots and cook the food inside.



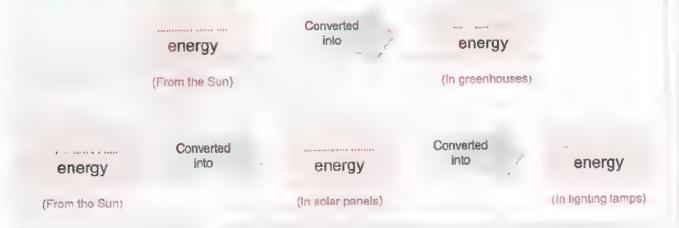
#### In heating water

Where, panels made of black pipes can be placed on the roof of houses to heat the water when it passes through these pipes, then the heated water is stored in a water tank to be used later.





## Complete the following energy chains:



#### Notes for parents

Let your child answer the questions to check his/her understanding.

# Activity 6 Solar Energy

- You already know the source and uses of solar energy.
- Now, we will study how solar panels convert solar energy coming from the Sun.

#### Solar panels

Solar panels can be very small that they can supply only one light bulb with energy, or very large that they can supply buildings or cities with energy.

#### How do solar panels work?

 Solar panels are composed of many small solar cells.

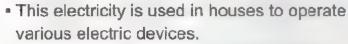


Solar panels

- These cells capture solar energy (especially radiant energy) coming from the Sun and convert it directly into electrical energy or thermal energy.
- Most solar panels are used to generate electricity.

#### Uses of electricity generated by solar panels

- This electricity can be used directly to light the streets.
- This electricity is used to recharge some types of batteries, like some calculators with small so ar cells.



 This electricity is used to operate irrigation equipment in some villages.



Calculator with small solar cells



#### Bhick your understanding

▶ In the table below, classify the following energies in the solar panel system into input and output energy:

(Solar energy - Electrical energy - Thermal energy)

Input energy	Output energy
	1

• Let your child mention some other electric devices that can be operated using the solar panels.

In the Exercises Book:

Try to answer

- Exercises on Lesson (2) p 66
- Self-Assessment (17)



# Activity 7 Harness the Wind

#### ▶ Put (✓) next to the renewable energies :









Now, let's know how wind turbines convert kinetic energy of the wind into electricity.

#### Using energy of the wind

Different amounts of solar energy (especially radiant energy) reach different regions of the world.





Radiant energy causes the air around the globe to heat up to different degrees, where the difference in temperature between cold and hot air causes air to move and wind to blow.





Kinetic energy of the wind movement is used to rotate the blades of windmills.





When the windmill blades rotate, this causes wind turbines inside the windmill to rotate, generating electrical energy that is transmitted through huge wires in power lines to different places such as houses and factories.



#### Notes for parents

· Discuss with your child how wind energy can be used to generate electricity.

#### ▶ The following diagram shows the energy chain of the wind turbines :

Radiant Heat Converted Kinetic Electrical Converted Converted into into into energy energy energy energy (From the Sun) (When temperatures vary (In wind turb nes) (In power ines) between hot air and cold air)



#### In water turbines :

- When the number of blades decreases, they rotate faster, so the efficiency of wind turbine increases.
- When the kinetic energy of wind increases, the blades rotate faster, so the efficiency of wind turbine increases.
- When the wind blows from the side of wind turbine, the blades rotate faster, so the efficiency of wind turbine increases.
- When the wind blows from the front of wind turbine, the blades rotate slower, so the efficiency of wind turbine decreases.

# Check your understanding

#### ▶ Put (√) or (≯):

1. Kinetic energy of the wind is converted into electrical energy by wind		
turbines.	(	)
2. Wind is a non-renewable energy resource.	(	)
3. The difference in air temperature around the globe causes air to mov	e	
and wind to blow.	(	)
4. Wind turbine blades rotate at a slower speed as wind kinetic energy		
increases.	(	)
5. The efficiency of the wind turbine can be increased by increasing		
the number of its blades.	(	)
6. The speed of the wind turbine blades varies with the direction of wind		
movement.	(	)

#### **Optional Digital Activity**

Activity (8) "Building a Turbine" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book.

Let your child answer the questions to check his/her understanding

In the Exercises Book:

#### Try to answer

- Exercises on Lesson (3) p 70
- · Self Assessment (18)



# Activity 9 **Falling Water**

## ▶ Look at the following pictures, then put (✓) or (木):



Turbine (1)

Turbine (2)

- 1. Turbines (1) and (2) are used to generate electricity.
- 2. Turbine (2) uses the kinetic energy of water to generate electricity.
- 3. Turbine (1) is used in places, where there are strong winds to generate electricity.
- You have known that wind can be used to generate electricity.
- Now, we will study how water can be used to generate electricity.



- Rivers flow downhill and during this process the gravitational potential energy of water is converted into kinetic energy that helps rotate water turbines to generate electricity.
- Dams are built on rivers to control the water flow and increase the potential energy of water to generate electricity.

#### Falling water

How can electricity be generated from dams using water turbines?

- The flow of water can be controlled to generate
- 1 electricity, as the dam prevents the flow of water, so the potential energy of water increases.



Water dam

#### Notes for parents

Discuss with your child how the energy of running water can be used to generate electricity.

- When water is released, it flows through water turbines in dams.
- The flow of falling water helps water turbines rotate and generate electricity.
- This electricity is sent through long electric wires to the places where it is needed, and this type of electricity is called 'hydroelectric energy' or "hydroelectricity".

#### Hydroelectric energy (hydroelectricity):

It is a type of electrical energy generated by water turbines in dams.

The following table shows the similarities and differences between the use of water and the use of wind to generate electricity:

# The use of water to generate electricity

The use of wind to generate electricity

Differences

Water is used in places where dams are built on rivers.

Wind is used in places with strong winds.

#### **Similarities**

- Both of them are renewable energy resources.
- Both of them use kinetic energy.
- Both of them operate turbines.

- Both of them generate electricity.



#### Check your understanding

▶ Complete the following sentences using the words below :

(wind turbines – water turbines – hydroelectric energy)

- Water flows through in dams to generate electricity.
- 2. The electrical energy generated by water turbines in dams is known as
- 3. In places with strong winds, are used to generate electricity.

In the Exercises Book:

#### Try to answer

- Exercises on Lesson (4) p 73
- Self-Assessment (19)

· Discuss with your child the meaning of hydroelectricity.



## Activity 10

# **Modeling a Turbine Generator**

#### ▶ Look at the opposite picture, then answer the questions :

 Can electricity be generated using the opposite water turbine?





 Can electricity be generated if the water flow to the turbine is cut off?







- You have learnt how the energy of water movement is used to generate hydroelectric energy.
- Now, you will design a model of a water turbine.

#### Tools



Ball of white cork



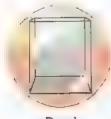
4 plastic spoons



Toothpick



3 wooden sticks



Bowl



Jug

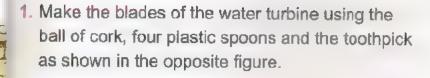


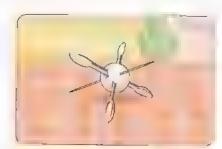
Wax gun

#### Notes for parents

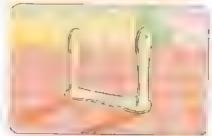
· Help your child make a model of water turbine

#### ▶ Steps

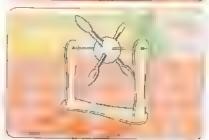




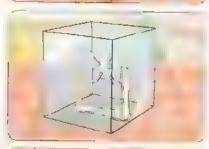
Make the base of water turbine by using the three wooden sticks and the wax gun as shown in the opposite figure.



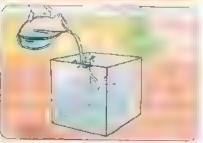
Fix the blades to the base as shown in the opposite figure



4. Place the turbine inside the bowl.



Fill the jug with water, then pour it over the blades.

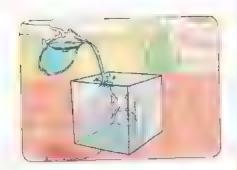


#### ▶ Observation

:ks

The blades rotate when water is poured over them and stop when the water inside the jug is completely run out.

6.When the water in the jug runs out, refill it with water from the bowl and pour water over the blades again.



#### Observation

The blades start to rotate again.

#### Conclusions

- Water is a renewable energy resource.
- The kinetic energy of moving water in rivers is used to rotate water turbines to generate hydroelectric energy.

#### **₽** Note

In the previous activity, the water used to rotate the blades was not run out but renewed by filling the jug again, which simulates what is happening on the Earth, where:

- The river's water does not return back to its source on its way through the dam but it flows into other bodies of water, evaporates then condenses into clouds.
- When rain falls from these clouds, the water returns again to the river and this is called the water cycle.



The water cycle



#### ▶ Put (✔) or (⊁):

- Water is a non-renewable resource that is used to generate hydroelectric energy.
- 2. In the water turbine, kinetic energy is converted into hydroelectric energy. (

#### **Notes for parents**

Discuss with your child the meaning of water cycle.

#### In the Exercises Book:

#### Try to answer

- Exercises on Lesson (5) p 76
- Self-Assessment (20)
- Model Exam on Concept. (3,3)
- Model Exam on Theme (3)



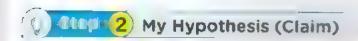
#### Activity 11

## Record Evidence Like A Scientist

- In this concept you have learnt a lot about renewable and non-renewable energy resources and the benefits of using renewable energy resources.
- Now, try to think like a scient st by writing your hypothesis (claim), your evidence
  and your scientific explanation about one of the main points of this concept through
  the four steps you have learnt in the previous concepts.



What are the different ways to use renewable energy resources to generate electricity?







#### **Optional Digital Activity**

Activity (12) "Solar Energy in Space" in the school book is an optional digital activity. You can do this activity by scanning its QR code found in your school book

<sup>•</sup> Herp your child to think like a scientist by answer come of the main points of this concept, hen write his/her hypothesis, evidence and scientific explanation.

#### **Activity** 13

# Review: Renewable Energy Resources

- We can summarize this concept with the following main points:
  - Hundreds of years ago, people needed machines to make their lives easier, so they used windmills and watermills to help them grind grain to make flour.
  - The following table shows the energy used in windmills and watermills as well as the advantages and disadvantages of each:

Points of comparison	Windmills	Watermills	
Energy used :	Kinetic energy of wind.	Kinetic energy of water.	
Advantages :	<ul><li>Low cost.</li><li>Renewable energy resource.</li></ul>	<ul> <li>Low cost.</li> <li>Renewable energy resource.</li> </ul>	
Disadvantages :	Sometimes the wind does not blow and the windmills do not move, so they are unable to do their job.	The water supply may dry up and the watermills do not move, so they are unable to do their job.	

- The Sun is a star which is made up of gases (mostly hydrogen and hel um).
- The Sun has a photosphere which is the gas layer at the surface of the Sun, where the light we see is emitted.
- The energy of the Sun comes when hydrogen and helium react at very high temperatures, producing huge amounts of light and heat that travel through space in the form of waves, some of these waves reach the Earth.
- The energy comes from the Sun is called "solar energy", which is radiant light and heat from the Sun.
- The solar energy that is produced by the Sun contains a type of energy called "rad ant energy" (radiation) which is found in the Sun rays.

#### Notes for parents

Help your child review the main points in this concept.

# , Uses of solar energy ;

- Solar energy is a direct source of thermal energy when exposing yourself to the Sun to feel warm.
- In greenhouses, radiant energy is converted into thermal energy which warms the inside of the greenhouses.
- most of the day.
- In cooking food, where curved mirrors are used to collect and focus Sun rays to neat metal pots and cook the food inside.
- n neating water, where panels made of black pipes can be placed on the roof of houses to heat the water.

especially rad ant energy) and convert it into electrical or thermal energy.

#### . Uses of electricity generated by solar panels:

- Light the streets.
- Recharge some types of patteries, like some calculators with small solar cells.
- Operate various electric devices in houses.
- -Operate irrigation equipment in some villages.

#### The following diameter he energy chain of the wind turbines:

Radiant energy	Converted into		i-Pat etorgy	Converted into	K'netic energy	Converted Into	Electrical energy
From the Sun)		<i>\\</i>		recar)	(in wind turbines)		(In power lines)

#### In water turbines:

- When the number of bic , they rotate at a , so the efficiency of wind turbine increases.
- When the kinetic energy of wind . . . the blades rotate fas.ci, so the efficiency of wind turbine increases.
- When the wind blows from of wind turbine, the blades rotate faster, so the efficiency of wind turbine of asset.
- \*When the wind blows from the total of wind turbine, the blades rotate slower, so the efficiency of wind turbine de feeces.

#### Water is used to generate electricity, as:

- Rivers flow downhill, the gravitational potential energy of water is converted into kinetic energy that helps rotate water turbines to generate electricity.
- Dams are built on rivers to control the flow of water and increase the potential energy of water to generate electricity.

#### Hydroelectric energy (hydroelectricity):

It is a type of electrical energy generated by water turbines in dams.

 The following table shows the similarities and differences between the use of water and the use of wind to generate electricity:

The use of water to generate  electricity  Diffe	The use of wind to generate electricity
Water is used in places where dams are built on rivers.	Wind is used in places with strong winds.
Simi	lanties
- Both of them are renewable energy	- Both of them use kinetic energy.
resources Both of them operate turbines.	- Both of them generate electricity.

#### Water is a renewable energy resource, where:

- The river's water does not return back to its source on its way through the dam but it flows into other bodies of water, evaporates, then condenses into clouds.
- When rain falls from these clouds, the water returns again to the river and this is called the water cycle.

# UNIT THREE Project

## **Dams Impacts**

#### ▶ Read the following paragraph to learn some facts about dams.

- In modern times, scientists and engineers use the kinetic energy found in river water to generate electrical energy by building dams on rivers to control the flow of river water and use it to rotate water turbines that generate electricity.
- The construction of dams on rivers to generate electricity depends on the idea of making artificial waterfalls to simulate natural waterfalls, in order to increase the kinetic energy of river water, which is used to rotate water turbines to generate a type of electrical energy known as hydroelectric energy.



Water dam

# The construction of dams has many advantages and benefits for humans and the environment, such as:

- Providing people with the electrical energy needed for lighting and operating different devices in homes, factories... etc.
- Helping people control the level of the river water to protect the agricultural lands on both sides of the river from the danger of flooding.

# However, the construction of dams also has many disadvantages and negative effects on humans and the environment, such as:

- Changing the path of rivers, which affects the migration of fish through those rivers, which causes the death of fish or their migration to other water areas,

so people are affected as they depend on fish as a source of food.

 Lakes that are formed behind dams cover large areas of land with a very big amount of water and these lands are considered as a habitat to many animals and plants, so this leads to the death of these animals and plants or the migration of these animals to other areas.



Flood

Let your child make a research about the effect of building dams and share it with his/her friends.

Use the previous paragraph, other printed or online sources to make a research project about dams. Your research must include the following main points:

- An energy chain shows the energy changes of the kinetic energy of moving water to get electrical energy in a dam.
- Advantages of building dams for humans and environment.
- Disadvantages of building dams for humans and environment.

# - Finding a solution to one of the problems of building dams. Energy chain of a dam: Advantages of building dams: Disadvantages of building dams: A solution to one of the problems of building dams:

# INTERDISCIPLINARY Project

## Sunny Side Up

- In many villages around the world, people depend on wood of trees as fuel to cook food and for this reason people in these areas cut down a lot of trees, which causes the removal of a lot of forests worldwide, which has negative effects on the whole world, such as :
  - The disappearance or death of some animals that lived in these forests before they were removed.
  - The disappearance of many types of plants that are used in the manufacture of medicines.



Deforestation

- Deforestation can be stopped by using solar energy instead of wood of trees as a source of energy for cooking food, as solar energy is free, clean and renewable energy. But, there are some difficulties that humans face when using solar energy as a source of energy, including :
  - The materials used to collect solar energy are very expensive.
  - The amount of sunlight that reaches the Earth is not the same from one place to another on the Earth's surface.
- A solar cooker is a device that converts solar energy into thermal energy used in cooking food.
  - It contains metal plates placed in a certain way to collect the largest amount of solar energy and focus it in one area, and it also contains materials that keep the generated thermal energy inside the solar cooker for a period of time enough to cook food inside.

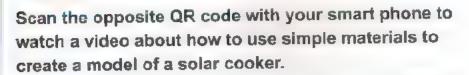


Solar cooker

In this project, use the steps of the "Engineering Design Process" that you have learnt in the previous educational grades to create a model of a Solar Cooker that can be used in sunny regions to cook food.

Help your child to create a model of a solar cooker that uses the solar energy to cook food.

#### Note





#### Idea

Create a model of a solar cooker that can be used to cook food using some simple materials.

#### **Materials**

You may use the following materials to create your solar cooker :



Chro





Carton box

Glue

Black paper sheet

Aluminium foil



White cork sheets

Transparent plastic sheet

Wooden stick

#### Plan

#### Build

praw the design of your solar cooker model.

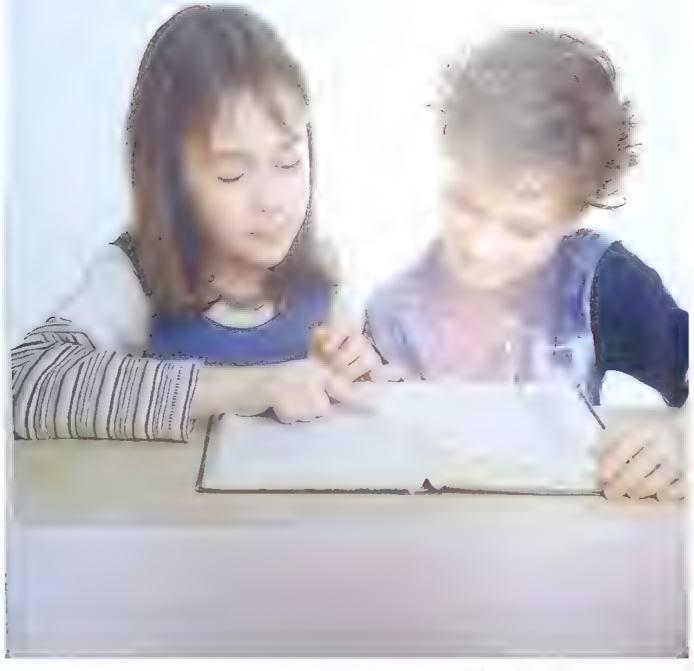
#### Test

Test your solar cooker and write your observations and problems you may find in your model.

#### - Improve

Write down your ideas . Improve your solar cooker model.

# G1055311Y



and the same of			
	min.to	minute -	and the latest and th

1.40	وسادة هوائمة
Arbag	مادث
Accident	
Bat	مضراب
Balance	مبزان
Collision	تصادم
Collide	يصطدم
Conversion	تحويل
Cricket	لعبة الكركيت
Cushion	وسادة
Crash	تحطم
Clay	ي لے
Crash investigator	محقق التصادم
Car manufacturers	صانعى السيارات
Driver	سائق
Dashboard	لوحة عدادات السيارة
Deflate	يقرع الهواء
Endanger	معرض للخطر
Examine	يفحص
Fold	یب در معری
Forceful	قوي
Inflate	بتسام
Irregular	غير منتقم
Injuries	إصايات
Laws	ا قو انيان
Mass	فواديد كتلة
Moment	لحصة
Marble	
Nylon	بلی
Newton's cradle	البابلون راحيات
Popping sound	لعبة تبونن ساستان ال
Passenger	صوت فرقعة
Post	را کپ
Suddenly	عمود
Safety equipment	فجأه
seamelt	معدات الامان
Steering wheel	حرام الأمان
Sensors	عملة لقبادة
Severe	حبيب سيال
String	تبديد / حاد

Scene	
Traffic sign	
Tasks	200
Vehicle	علامة مودار
Vents	تامهم
Wrecking ball	مركبة
Wobble Vall	ثنوب / يتحاث
. TODDIG	ي الندمين



	The second secon	
لعبة الكركب	Convert	
وسادة		
تحطم	Conservation of energy	بتحول ١١٠٠
صل ن	Control remotely	حيف الطاقة
محقق التصا	Chemical energy	التحكم عن بُعد
صانعي الس	Consumed energy	ط قد کیمیائیة
سائق		المائة المستهدية
الوحة عدادات	Create	أجم
يقرع الهواء	Device / Equipment	يخلق
معرض للخط	Destroy	جهاز
يفحص	Distant	ينمر / يعني
مطری	Exploration	بالمياد
قوي	Energy chain	التكتاف
بنمح	Electrical energy	الطاقة الطاقة
غبرمنقم	Emit	طاقة كهرسة
إصايات	Electric power station	يشع اتقم كارية
وانان فرانان	Energy path	محطة قوى كهربية ممار الطاقة
كتلة	Friction	مار الفاقة اجكاك
لمعة	Generate	4
	Illuminate	يولد
بلی	Kinetic energy	یطئ خافة حرکة
الديلون	Mars	
لعبة تبونن	Mission	المريخ
صوت فرقعة	Nowadays	دهمة في الوقت الحاضو
ر کپ	Potential energy	المالية المالية
عمود	Produced energy	ا فاقد باحد
فجاه	Rover	بتاهول
معدات الأمار	Recharge	اعاده تبحي
حرام الأمان	Run out	ىند
عحلة القبادة	Ropot	اسسان ہی
حساسات	Sound energy	طاقه صوتند
شديد / حاد	Solar panels	ألوح شمسيه
خبط / وتر	Spring	رئيرك
		3.7

Solar energy	طاقة شمسية	Living organisms	
Thermal energy	طافة حاربة	Lifetime	م سین
Tyre	أطار العجبة	Limited	~
Tracking	سه	Marine	* ****
Wasted energy	طاقة مهدرة	Mud	Up
or or or or or or	94-	Natural gas	***
Concept	32	Notice	S* 2
	<b>U.M.</b>	Non-renewable	-daily
Alternative	بديل	Operating	مر شیده
Acid rains	أمطار حبطية	Oil rigs	معس .
Atmosphere	الفلاف الجرى	Oil	مدر سيط
Appliances	أجهزة	Pressure	a:
Burn	يحترق	Pollutants	new
Biofuel	وقود حبوى	Phenomenon	
Buried	مدقون	Pesticides	فاهرد شيد ب همرية
Consume	يستهلك	Rotate	
Charcoal	فحم نياتي	Renewable	بدور
Conserve	يرشد	Rationalize	محد
Carbon dioxide gas	غاز ثاني أكسيد الكربون	Rapid	
Carbonic acid	حمض الكربونيك	Remains	سرنه
Climate	مثاخ	Resources	يقاه
Concern	هتماء	Several	وساده
Deforestation	أزالة الغابات	Swamps	ٽال <i>و</i> ند
Decomposed	متحلل	Settle	
Disadvantages Extracted	عيوب	Sediments	~~ <u>~~</u> ;
	مُستخرج	Steam	
Engine Expensive	محرك	Smog	حبات ، دها
Fuel	عالی	Set laws	بتسع قراس
Forms	وقود	Structure	تركب
Formation	صور > .	Transform	لتحول
Fossil fuel	لکوین و <b>قود حفری</b>	Turbines	تاسيه
Gasoline pointer		Trap	
Generator	مؤشر أبيارس مُولد	Unplugging	عصال
Global warming	موند حثباس حراری	Warming	أنادالنيد
Gasoline		Wheels	عملات
Hydroelectric energy	سزس طافة كهروماشة	Wind energy	الله الله الله الله الله الله الله الله
Harms	اصرار	Wood chips	رقائل لحشب
	, صر، ر		

ری

بهيح

طبعة

بدلا من

Irrigation

Instead of

Irritate

Layer



Wooden sticks Windmills Watermills Waves

عصی حشیبة طواحین هرائیة طواحین مائیة مرح ب

Absorb محصى Blow ---Bowl 4: Capture Len Curved mirrors م یا مناحب Crops محاصين calculator لدحسه Cork one Condense يكتف Cycle دوره Disappear رجيفي Degrees درحات Downhil إحدر Efficiency کھ ءد Evaporate تتبح Enables غكى Fashlight مصباح يسوي Grind grain فحل أخوب Greenhouse شولة رجاحته Globe كرة رصمه Gravitational خاديبه Harness \_\_\_\_ Jug ارو Low cost - 50 Machines Meta pots Pipes Depend on Roof Can Radiation اسدع Radiant Russa Refill اعادة تعيلم Stove مُوفد Star 2 Survive تحتی / بعبش Supply اسداد

تحاكي

لمري

عود أسان

Simulates

Toothpick

Villages

# This Exercises Book

Includes Three Parts

Part

#### **Exercises on Lessons**

(Page 3)

1

#### Includes:

Variant questions on each lesson of concepts.



All questions in this part are classified according to Bloom's taxonomy.



Part

#### Self-Assessments

(Page 78)

2

#### Includes:

- Cumulative self-assessments on lessons of each concept.
- A model exam on each concept.
- A model exam on Theme (3).



Part

#### **Final Examinations**

(Page 116)



#### Includes:

 Models of final examinations on the second term.



# Pan

# Exercises on Lessons



## **Exercises**

on Lessons of Concept (3.1)

Understand

@ Apply

Analyze

Evaluate

• Create

# Figgrains on Linear 1

1	Cł	oose the correct a	nswer :		
-		a moving forward and	and backward.	b rotations, excep d, rotation in a circl	he moon.
		a chemical	b sound	changes into e ectric c light	G GIOTHAL
C	3	E ectrical energy pr	roduced from a toy ca	ar battery can be cha	
		a. mechanical - sou c. mechanical - sou	ınd - solar	b. mechanical - the d. sound - thermal -	
0		The energy source a. engine,	in a toy car s the b. tires.	c. battery.	d. fuel.
				travel from Earth to	
e		a. seconds Curiosity rover is de		c. days	d. months
	i	a. Earth planet.	b. Mars planet.	c. the Sun.	d. the moor

#### Put (v) or (x):

1. Energy cannot be transformed from one form to another.
2. We can convert the solar energy into different forms of energy.
3. We can continue to move a toy car even after its patter, its patter

#### Correct the underlined words:

- 1 The solar energy produced from the moon can be converted into different forms of energy
- 2. Toy cars depend on fuel as a source of electrical energy.
- 3. Curiosity is a robotic vehicle that is designed to explore the surface of moon.

•	1. 2.	The source of energy in some toys that stores chemical energy ( )  The energy produced from batteries. ( )  A robotic venicle which is designed to explore the surface of Mars ( )
	C	omplete the following sentences :
0		The energy can be from one form to another.
٥	2	Remote controlled toy cars changes energy stored in its batter es into energy that in turn changes into energy which is used to move the car.
ø	3.	To operate an electric mixer we use energy.
		When your cell phone is out of charge you must rechange its to operate it again.
	5	Some calculators can change sclar energy into energy by using the sunlight.
	6	On Mars planet. Cur osity robot can be operated for a long period of time by using
9-10	G	iive reasons for :
£ E.		A remote controlled toy car needs traiter, to move from one place to another
	2.	Some calculators use the sunlight to be operated.
	3	Mars rover Curlosity was cherales for long period of time on Mars without any need to be recharged.
-	V	that happens if ?
•		The charge of remote controlled toy car batteries is running out.
	2.	Solar calculators were exposed to the sunlight

3. Mars rover Curiosity didn't get any sunlight on Mars surface.

# Look at the following figures, then put $(\checkmark)$ or (x):



car (1)



car (2)

- 1. The movement of the two cars can be controlled from a distance by using a remote control.
- 2. Car (2) use sunlight to move.
- 3. The two cars can convert the chemical energy stored in their batteries into electrical energy.
- 4. We can use an electric cable to recharge the battery that is placed in car (1) again if it runs out.

#### Exercises on Lesson

	C	hoose the correct answer:	2.7			
	1	In the hair dryer, the electrical energy ch.	anges into and energies			
		a. sound - thermal	b. kinetic - light			
		c. thermal - light	d. light - sound			
	2	In the washing machine, the energ	y changes into kinetic and sound			
		energies.				
		a. light	b. electrical			
		c. thermal	d. potential			
	3	You feel warm when you rub your hands changes into thermal energy.	together, because energy			
		a. kinetic	b. ight			
		c electrical	d. sound			
	4	Plants can convert the light energy from stored inside the plant in the form of sug				
		a. sound	b. electrical			
		c. chem cal	d. kinetic			
	5	When you eat an apple your body co. //apple into energy when you move	erts the energy stored his de the			
		a. chemical – electrical	b. kinetic – chemical			
		c. electrical – chemical	d. chemical – kinetic			
Ü	6.	Electric wires are made of				
		a. copper.	b. paper.			
		c. wood.	d. glass.			
	7	Which form of energy is not used or group	uced when you turn on an electric bulb?			
		a. Electrical.	b. Light.			
		c. Thermal.	d. Sound.			
	8	When you use the hand bell, the e	nergy changes into sound energy			
		a. light	b. thermal			
		c kinetic	d electric			
d)	9	Which sentence shows the energy chan	ges in the flashlight in a correct order?			
		a Chemical — electrical — light.	b Chemical — light — electrical.			
		c Electrical - chemical - light.	d. Light chemical electrical.			
	10	. If the energy doesn't go through the	he electric fan's wire, it will not turn on.			
		a. sound	b. electrical			
		c kinetic	d thermal			

See .	
Put (v) or (x):  1. In the soap dispenser, potential energy changes into electrical energy.  2. In the electric blander, around energy changes into electrical energy.	Jy- (
In the soap dispenser, potential energy changes into electrical energy     In the electric blender, sound energy changes into electrical energy and kinetic energy.	ЭУ ,
- Ware electric DISUOSE SOUTH PROPERTY.	(
and the state of t	( '
? Mes of energy thans starts with the moon	,
5. Both hair dryer and washing machine depend on the same kinc.	1
of energy to be operated.  The energy produced from but the sound energy produced from but the energy produced from the e	Jrning in
the sound energy pro-	(
of coal can be changed into electrical energy.	another, '
of coal can be changed into electrical energy.  There is energy loss when energy is transformed from one form to	1
Enciel Tab he destroyed neight some devices	, ,
E ear a bulb depends on chemical energy to be operated	1 .
Some elect is burn and electric heater produce thermal energy.	( ,
See	
term for each of the following:	(
<ol> <li>The energy produced from a battery.</li> </ol>	,
2. The energy used to operate a television.	(
3 The main source of energy for most forms of energies on Earth	,
4 The energy produced when the wood of trees is burned.	(
5 s produced from the remains of dead trees buried under	
the Earth's surface over millions of years.	(
<ul> <li>6. The energy that is used to operate an electric heater.</li> </ul>	(
• 7. The energy stored inside the coal.	(
Complete the following sentences:	
The energy that is produced from the battery used to operate a second control of the control	· car is
energy.	
• 2 When you press on the soap dispenser, you turn the energy spring into energy that moves the soap upward.	stored in its
3 The energies that are produced from the washing machine are	energy
and energy.	energy
4 When you rub your hands together, the energy is converted	into
energy.	
5. In any energy chain, some of the energy is lost in the form of	
6 The electric lamp converts electrical energy into energy and	energy.

7 The is the primary source of energy that is transferred to the food in the

form of chemical energy.

#### Give reasons for

- 1 When you press on the spring of soap dispenser the soap moves upward. (according to the change of energy).
- 2. When you rub your hands together, you feel warmth.
  - 3 Not all the energy that enters the energy chain reaches the device completely
- What happens if ...?
  - 1. You turn on the T.V

(according to the change of energy)

2 You burn a piece of wood.

(according to the change of energy

3 You shake a small bell with your hand.

(according to the change of energy

same word more than once).

Two ou may use the

(Thermal - Chemical - Kinetic - Electrical - Sound - Light)

1. The energy chain of burning some branches of a tree:

converted So ar energy (stored inside the tree) (when burning the wood of branches)

2 The energy chain of electric blender

converted. ene gy converted So ar energy energy nto and energy (The coal from the remains of dea (t.e.) in a set one oscillates (from the Sun)

> energy converted converted energy into into energy and (in the electric blender)

(transfe red in electric wires)

1 \*



Choose from column (A) what suits it in both columns (B) and (C):

•	Choose from column	(C) Energy Produced	
	(A) Energy used	(B) The device	Energy Houded
	1. Kinetic energy	a.	A. Thermal energy.
	2. Electrical energy	b.	B. Chemica energy.
	3. Solar energy	c.	C. Sound energy.

2

# Engine with the Color

Sin .	(	hoose the correct ar	ISWel						
	1	In the electric waler kettle, the electrical energy changes into linearity that							
		can warm the cold v							
		a. sound	b. thermal	c light	d. kinetic				
	٠	While playing a guit	ar the energy	changes into sound	srery/				
		a. kinetic	b. light	c chemical	d potential				
	1	ns de a light buib, e	electrical energy chai	nges into and	energies				
		a. sound - light		b. sound - therma					
		c kinetic - light		d. light – thermal					
	1	"hen you turn on a	light bulb, the electr	cal energy travels t	nrough	~ "			
		reaching the bulb.							
	_	a. wires	b. glass						
0	5	. Both hair dryer and							
			b. thermal	c light					
	S	Some kinetic energ	y is converted noo	energy due to fr	iction of sike s	:: 18			
		with the road.							
		a. light	b. electrical	c potential	d thermal				
r A	P	ut (V) or (X):				_	_		
0	1.	There is a stored ch	nemical energy inside	e the food we eat.		(	)		
	2	Asaros, of from	n brillion on oil this	a cathe road kinet	ciene gv				
		changes into chemi	cal energy.			(	)		
0	3.	When pedalling a bi	ke, the chemical en	ergy in your body					
		changes into kinetic				(	)		
D	4.	Energy can't be cha	inged from one form	to another,		(	)		
	W	rite the scientific te	rm for each of the f	ellowing					
		The energy produce			2125		)		
		Energy can neither					1		
		from one form to an		, , , , , , , , , , , , , , , , , , , ,	(		)		
	3	The energy produce	ed from playing gu ta	r	(		. )		
	4	The energy used to play a drum.							
		3, -,, -,	piay a urum.		(	,	1		

# Complete the following sentences:

1. When you ride a bicycle, the energy stored in your body is converted into energy which causes the bicycle to move.

Evaluate

Create

- 2. Some kinetic energy of the bicycle is converted into energy due to the friction of its tires with the road.
  - 3 The electric lamp converts . energy into light energy and energy.
  - 4 The change of electrical energy into sound energy in the radio is an example that proves the law of
  - 5 Energy can neither be nor , but only from one form to another

# Give reasons for :

- 1. You feel heat, when you put your hands near a lighted electric lamp.
- 2 The presence of batteries inside a toy car.

What happens if you put your hands near the lighted lamp.

Look at the following figures, then complete the folio



Figure (1)



Figure (2)

- 1 Figure (1) converts energy into ..... energy.
- 2 Figure (2) converts energy into energy and ...... energy.
- 3 The energy chain that is produced due to inserting figure (1) inside figure (2) and turning it on is

 $\frac{\text{energy}}{\text{energy}} \xrightarrow{\text{converted}} \frac{\text{converted}}{\text{into}} = \frac{\text{converted}}{\text{into}} = \frac{\text{energy}}{\text{into}} \times \frac{\text{converted}}{\text{into}} = \frac{\text{energy}}{\text{into}} \times \frac{\text$ 

#### February I. Choose the correct answer: 1 The input energy when using the hair dryer is the a. electrical b. potentia: c. kinetic d thermal 2 Which of the following forms of energy is not considered an example of output energy when hair dryer is used?... a. Kinetic energy, b. Electrical energy. c. Thermal energy. d. Sound energy. 3 During charging a mobile phone the energy is converted into energy that is stored in the phone battery. a. electrical - chemical b. chemical - thermal c. electrical - thermal d. thermal - chemical 4 Sound and energies are from output energies when operating the mobile phone. b. potential a. electrical c. chemical d. light 5. The output energy when playing drums is the ...... energy. a. chemical b. light c. sound d. potential 6 The produced al the mender do ts job a. chemical b. sound d. potential c. light 7. When a piece of coal is burnt, .... energy is produced. b. kinetic a. thermal d. potential c. sound 8. During the running of a player the chemical energy inside his body is converted into and energies. a potential - light h kinetic - light c thermal - kinetic a thermal - light Put $(\checkmark)$ or (x): Energy may be destroyed inside different devices 2. Some of the converted energy does not help some devices do the function

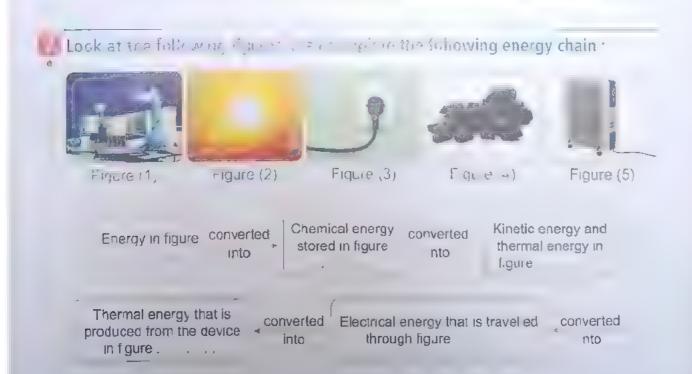
for which it was designed.

#### Give reasons for:

- 1. Thermal energy in mobile phone is considered as a wasted energy.
- 2 The electrical energy that is entered the hair dryer isn't come out of the hair dryer n the same form of energy.
- 3 Sound energy and thermal energy are considered as wasted energy in the blender.

### What happens if ...?

- 1 You use a mobile phone for a long time (according to the wasted energy)
- 2. You turn on an electric fan. (according to the change of energy).



# **Exercises**

on Lessons of Concept (3.2)

• unconstand	OArriy	e Analyze		.,63
		0- 1 I I I I	20	
Choose the corr				
· 300, 100 1 100	of fire! that pres	ent in cacifuecstati	ons are	
2250 (18 21		i natu	ral gas and coa	
c. wood and c		d. gaso	line and natural gas	
: 4. the con n	g are found dee	ply under the Eart	his surface except	
a natural gas		b. coal		
c. green plants	3.	d. oil.		
3 Miner the spe	edometer of a m	oving car refers s	uddenly to zero shis may	1 De
		ns, except		
	completely unic		attery is complete, dam	age
c. the driver pr	esses the brake	pedal		
d. the driver pr	esses the gaso	line pedal.		
<ul> <li>4. The opposite f</li> </ul>	igure represents	the fuel indicator,	(2)	P
	to that the fuel ta			
	y empty from ga		A.	
b. is completel	y full of gasoline	3.		
			nalf amount of water.	
E We can use the	e energy obtain	ed from burning of	WO C'S . LOOM	ng
situations, exc				
a, warming hou		b. opera	ating television.	
c cooking food	*	d. boilin	g water.	
Chaose from cole	ımn (B) what su	its it in column (A	)	
(A)			B)	
1 The Sun	a 11 15 C			
2 Fuel	b its lice	perated by electri	City	
'3 Gasoline	plant	s and gy change:	s into chemical energy in	

plants

2.

when it is burned.

42

'3 Gasoline

1. .

c if is a liquid that can be used as a fuel for cars

d. it is any substance that produces thermal energy

3.

	P	ut (/) or (x):			
	1.	As the speed of the car increases, the amount of used fuel decrease	es	(	)
	2.	It is better before making a trip by a car, we must check the amount	of		
		gasoline in the fuel tank.		{	)
		You need gasoline to move a bicycle.		(	)
		Both coal and wood produce energy on burning them.		,	)
ľ	J.	We cannot drive a car that doesn't contain fuel.		(	/
	C	orrect the underlined words:			
0	1	We need sound energy, for cooking foods and warming houses.	(		)
	2	The moon is the main source of most energies on the Earth's surface	ce		
			(		)
	3	Fuel is the substance that produces electrical energy on burning.	(		1
	y VI	Vrite the scientific term of the following:			
	1	It is the main source of most forms of energy on the Earth's surface	1		
			(		)
	2	The form of energy that is produced as a result of burning of wood	and co	al	
			(		)
	3	It is any substance which produces thermal energy on burning.	(		)
	10	Complete the following sentences :			
	1	Gasoline burns insing a dareling ratury and ide energy that	at sch	ange	ed
		into energy which causes the movement of the car.			
z	2	. Some forms of fuel can be used in cooking such as,			
		and			
	3	. Coar, and can be used in electric power station electricity.	s to ge	nera	ite
	4	. We can use some forms of fuel such as . and in houses	warmı	ng	
		Sive reasons for :			
		. The fuel is very important for different means of transportation.			
	ľ				
	,	2. Comptimes the fuel indepetor of a per good day of			
	4	2. Sometimes the fuel indicator of a car goes down.			
			4		

- 3 Gasoline burns inside a car engine.
- What happens if ...?
  - 1. The amount of gasoline in a car decreases (according to the car fuel indicator)
  - 2 Fuel unsoutin a car

(according to the car movement).

#### Look at the opposite photo, then choose the correct answer:

- 1. Coal is a type of fuel, which is used in all the following purposes, except .......
  - a. cooking food.
  - b. skating on ice.
  - c generating electricity.
  - d. warming houses.
- 2. Coal burns to produce
  - a thermal energy
  - c. natural gas.
- b. sound energy.
- d, wood of trees. 3. Coal and ...... are used in warming houses.
  - a water

b. plastic

c sand

d. wood

# Entre an Limber (2)

	C	hoose the correct an	swer.		
0	1.	All the following are	forms of fuel, except	t	
		a. wood,	b natural gas.	c. gasoline.	d. glass.
	2	s conside ed.	as the main resourc	e of energy on the E	larth's surface
		a. Gasoline	b. The Sun	c. Natural gas	d. The moon
r	3	All the following are	renewable resource	s of energy, except	
		a. natural gas.	b water.	c the Sun.	d wind.
	4	The non renewable	resources of energy	take to be fo	rmed
		a. a short period of t	ime	b. a very long perio	d of time
		c. few minutes		d. few hours	
	5	Ancient people use	as a form of fu	el pefore discoverir	ng gaso me
		a. electricity	b. water	c. wind	d. wood
ø	6.	Wood is considered	as		
		a. biofuel.	b. fossil fuel.	c. liquid fuel,	d. gaseous fuel.
0	7.	Coal is formed unde	r the Earth's surface	from the remains o	f
		a. dead animals.		b. dead plants.	
		c. dead humans.		d dead insects.	
	8	Extreme hear and pr	ressure under the Ea	aith s surface has ar	ımportant roie in
		forming			
		a %000	b. Wind.	c. fossil fuel.	d biotuel.
L	C	hoose from column (	B) what suits it in co	olumn (A):	
١		(A)		(B)	
	1	Water	a it needs extrer	ne heat and pressur	e to be formed
	2	Wind energy		of dead p ants.	
	3	. Coa	b. it is the main resurrace	esource of energy o	n the Earth's
				renewable resource	e of energy.
				newable resource of	
	_				

<b>13</b> Put (✓) or (X):			
1. Biofuel is one of non-renewable resources of energy.		(	}
2 Extreme analog industrial this subser to proceed the subserver of the su	'	,	
oil.		(	)
2 Made and gas in the two retinants to second in officers			h.
4 Ne have to educe the sage of the oral as a solver of a solve			
5 The consemption of oil is stower than Is four ite ince the For		4	
surface.		(	)
3 The Start the primary source of forming both biofice at . " of the	,		
<ul> <li>7 We can make a liquid fuer from grass and wood chips.</li> </ul>		(	)
Correct the underlined words:			
* 1 As have to increase planting vegetables and fruits if a neer	1	, 40 7	)
a large amount of water.		, ,	
2 hipouses gasoline is used in cooking foods as it is one of inchine known biofuels.	1		Y
The non-renewable resources of energy take a short belock of the to be formed under the Earth's surface.	1		1
		* * * * * * * * * * * * * * * * * * * *	,
4 The moon is the primary source of both biofue at a fossir fue			
5 vive can use some animais, to make a liquid biofile			
6 The rate of consumption of fossilifuel, must be increasing			
Nood is a form of fossil fuel that can be used not to			
8 Vater is a non-renewable resource of energial tractions	,		,
as a fuel in cooking foods and in moving cars.	(		.)
Write the scientific term of each of the .			
		`	
* Natural resources of energy that take a short period	1		1
C. L.	1		
2 Natural resources of energy, that take a very long, enactions			1
to be formed.			
3 It is a form of biofuel, that can be made from some types of plants			1
such as grass and wood chips.			]
4 They are fuels that are produced from remains of dead anima's			1
and plants under the Earth's surface			. )
5 It is a type of fossil fuel that is produced from remains of dead plant	3		
under the effect of extreme heat and pressure	(		)
6. It is a type of fossil fuel that is produced from dead marine animals	(		)

<b>6</b> Complete	the 1	following	sentences	
-------------------	-------	-----------	-----------	--

- 1. Water and are considered from resources of energy, while coal and ...... are from non-renewable resources of energy.
  - 2. The natural resources that can be replaced shortly after being used are called ...... resources of energy.
  - 3. The natural resources that are consumed at a rate faster than they can be renewed are called ......resources of energy.
  - 4 Different forms of fuel can be classified into two main types which are and
  - 5. The type of fuel that is produced from living organisms that can be planted is called ......such as wood and
- 6. Wood and ...... are examples of biofuel, while ..... and ..... are examples of fossil fuel.
- 7 Wood chips and grass can be used to make a ...... biofuel.

#### Give reasons for:

- 1 Water and wind are considered as renewable resources of energy.
- 2 Coal and gaso he are considered as non renewable resources of energy.
- 3 Using wood of trees as a filel cas regalive effects on the environment.

#### What happens if ...?

- 1. People increase using the wood of trees as a source of fuel.
- 2. The remains of dead living organisms were buried under the Earth's surface over mill ons of years.
- 3. Decomposition of remains of marine animals under the Earth's surface

#### Read the following paragraph, then choose the correct answer

Nowaday, we use gasoline and natural gas in means of transportation which are considered fossil fuels, while we can use coal which is a fossil fuel and also wood which is a biofuel in warming our houses.

1. Is a non-renewable resource of energy, that is considered as a fossil fuel and it is not used in means of transportation nowaday.

a. Water

b. Coal

e. Wind

d. Gasoline

2 A type of biofuel, which is used in warming houses and cooking food is

a. wood.

b. wind.

c. water.

d. sand.

3. A type of fossil fuel, which is formed from decomposition of plant remains is

a. wood.

b. sand.

c. wind.

d. coal.

#### Exercises on Lesson

#### Choose the correct answer:

0	1	Remains of living	organisms that were buried under the Earth's surface must be
		affected by	to form fossil fuel.

- a. low pressure and high temperature
- b high pressure and low temperature
- c. low pressure and low temperature
- d. high pressure and high temperature

0	2	All the f	ohowing	factors	play a	in împorta:	nt role	in the	formation	of	fossi	fue
		except	* * * * * * * * * * * *									

a. extreme pressure.

b. extreme heat.

c. The moon light.

- d. rocks and sediment.
- 3. All forms of fossil fuel are formed .........
  - a. above the Earth's surface.
  - b. under the Earth's surface.
  - c. above the water surface.
  - d. in the air around us.
- 4. All the following are forms of fossil fuel, except ..........
  - a. water.

b. coal.

c. natural gas.

d. oil.

- 5 Which of reference to the result of the resolution of the ference by man?
  - a. Oil and natural gas.

b. Oil and charcoal.

c. Natural gas and ethanol.

- d. Charcoal and ethanol.
- 6 The steps of forming fossi, fuel, don't include of the remains of the iving organisms.
  - a. decaying
- b. cooling
- c. burying
- d. heating
- 7 We can use the energy that is produced from ...... to generate electrical energy.
  - a renewable resources only
  - b. non-renewable resources only
  - c renewable and non-renewable resources
  - d food including fruits and vegetables
- 8. Hydroelectric energy is generated from
  - a. waterfalls only.

b. waterfalls and dams.

c. biofuel only.

d. biofuel and fossil fuel.

D	9.	All the following a	actions don't conserve electrical energy except				
		a. unplugging un	used electrical appliances.				
		b. plugging many unused electrical appliances.					
	c. turning on all the house lights all the day long.						
			evision turned on all the day long.				
	10	All the following are used to generate electrical energy, except					
		a. oil.	b. natural gas.				
		c. waterfalls.	d. rain water.				

11 Inside the electric power station, heating of produces steam. b. generators

a. turbines

C. Water

d. fuel

#### Choose from column (B) what suits it in column (A):

(A)	(B)
1 Rocks and sediment 2. Water 3. Oil	<ul> <li>a. is a liquid fossil fuel, that is used to produce electricity.</li> <li>b. is a liquid biofuel, that is used to produce thermal energy in houses.</li> <li>c. is a liquid in electric power station that on heating it produces steam which turns turbines.</li> <li>d. play an important role in the formation of fossil fuel.</li> </ul>
1	2

-					
13.00	Put	61	OF	(W)	
	ruc	W I	OI.	(O)	.0

2	I uc (r	701 (7)		
	1 Any	form of fossil fuel must be formed under the Earth's surfa.		)
e	2. Oil,	natural gas and coal can be used to produce		
	hydr	roelectric energy.	(	)
	3. Turn	ing off I gnts that we do not need, is a way to conserve electric	1	)
¥	4. Burr	ng of fossi, fuel inside electric power station produces		
	pote	ntial energy.	(	)
	5. The	movement of a generator in electric power stat on produces		
	pote	ntial energy.	(	)
	6 Wel	have to conserve all forms of fuel.	(	}

	C	orrect the underlined words:	
	1.	Fossil fuel include oil, coal and wood.	()
	2.	After death of living organisms, their remains are buried uncer the l	Earth's
		surface and exposed to extreme pressure and cool.	()
	3	Hydroe ectric energy is one of non-renewable energy resources	( )
	4	n electric power station, water turns turbines that produce kinetic e	nergy
			()
	5	The movement of generator in the electric power station changes p	otential
		energy into kinetic energy.	()
	₩	rite the scientific term of each of the following:	
	1	The type of fuel that is used inside the electric power station to pro-	duce
		electricity.	()
	2	The device in the electric power station, that produces kinetic energial	gy to operate
		generators.	(
	3	The matter hat produces steam on heating which is used to turn to	urbines in
		electric power stat on.	()
	4	hadevice in the electric powers aron than turns kinetic energy in	
		electrical energy.	( )
	C	omplete the following sentences:	
	1	n electric power services and natural g	gas which
		are considered as resources of energy.	
	2	The restriction of the resource of en	iergy,
		and we can get it from and dams to generate electricity.	
	3	When fuel situation if produces	energy to
		heat water.	
D		The electric generator changes energy into energy into	
	5	During generating electricity in electric power stations, the hot water which is used to turn turbines	er produces
e	6	Turbines in electric power stations are turned by steam and they page 1975.	roduce
	U	energy to run the of the electric power stations.	
	7	. Inside electric power stations, the burning of fuel produces	energy,
		while the movement of turbines produces energy	

### Give reasons for :

- 1. The importance of generators in electric power stations.
- 2 We must turn off lights that we are not needed for a while.

#### What happens if ...?

- 1 There is a damage happens in a turbine connected to a generator in an electric power station.
- 2. The water in an electric power station not heated.

  (according to the run of the turbine).

Look at the opposite photo, then choose the correct answer according to your studying of how electric power stations work

- 1. To generate electricity inside electric power stations, we ...... the fuel.
  - a. cool
  - b. mix water with
  - c. burn
  - d, mix sand with



Electric power station

- 2 The steam in electric power station is produced as a result of
  - a. heating the water.

b. mixing the water with fuel.

c. cooling the water.

- d. cooling the fuel.
- 3 During the steps of generating electricity inside electric power state is the first type of energy which is produced from burning of fuel
  - a. electrical energy
  - c. potential energy
- 4 The electric generator changes
  - a electrical kinetic
  - c thermal electrical
- 5. The movement of turbines produces
  - a, kinetic
  - c. chemical

- b. thermal energy
- d. hydroelectric energy
- energy into
- energy.
- b. electrical thermal
- d. kinetic electrical
- . energy
- b. potential
- d. hydroelectric

Put (🗸) in front of sentences which describe conservation of electricity :	
Turning off ights you will not need for a while.	
2. Let electrical appliances (devices) work all the time.	
3. Using energy-saving light bulbs.	
4. Leaving television turned on all the day long.	6 .
Arrange the following steps to show how electricity is generated in electric power station and sending it to houses and factories.	
() Steam turns turbines that produce kinetic energy.	
() Fuel burns and produces thermal energy.	
() Electrical energy sent to houses and factories.	
() Water becomes hot and produces steam.	
() Turbines turn generator that produces electrical energy.	

Choose the correct	answer:		
1. Air pollution is us	ually caused due to	of fuel.	
a. cooling	b. warming	c. freezing	d. bu
<ul> <li>2 To decrease the positive at that uses oil, in b. that uses coal, c. that uses natured, that uses coal,</li> </ul>	iside the city. inside the city. al gas, outside the		to build a
<ul> <li>3. Cars smog cause</li> </ul>	irritation of of	humans.	
a. stomach and e	yes	b. eyes and lun	gs
c. small intestine		d. large intestin	e
_	sue of human respi sue of human diges body grow up.	ratory system.	
<ul> <li>5. To reduce pollution</li> <li>a. gasoline or nature</li> <li>b. gasoline or electricity or nature</li> <li>d. gasoline or coal</li> </ul>	ural gas. etricity. eural gas.	have to operate ca	rs by
6. Acid rain is formed a. oxygen gas b. carbon dioxide gc. dust d. sand		nbines with rain wate	er.
<ul><li>7. All the following are</li><li>a. global warming.</li><li>b. death of trees.</li><li>c. chemical change</li><li>d. chemical change</li></ul>	es in lakes.	of acid rain, except	14+47+14+4+p

	(A)	(B)	
	1. Oxygen gas	a. it is a liquid that is considered as non-renewable resource of energy.	
	2. Carbon dioxide gas	b. it is a gas that is necessary for respiration living organisms	n of
		c. it is a gas that causes trapping heat above Earth's surface when it increases in air.	re the
	1	2	
	Put (v') or (x):	-	
		in both pesticides and carbon dioxide gas	/
		ssue damage to the human respiratory system	ſ
0	3. Acid rain causes soil and wa		ſ
0		ne decomposition of some rocks.	*
		Earth's surface causes global warming.	(
0	6. Acid rain helps trees to surv		(
		serve norenewable resources of energy,	
	we must decrease their usin	g.	(
H	Alvita	, ,	
	1 It sar scot o	, coop groxide gas with water (	
	2 It sacheres.  when carbon dioxide gas in	r emperature increases,	
		ases with the all.	
	amount of cars smog.	(	
		med when carbon dioxide gas combines	
	Complete the following center	ancac .	
	Complete the following sente	ater in canals, this causes the pollution of	
	and .	ator in dariato tina daddos the pondion of	

2. Factories may cause the pollution of

the chemicals they use.

due to

and

#### Give reasons for :

death of trees.

1. Smog of cars are very dangerous to human health.

9 Chemical changes in the structure of due to

- 2. Farmers must decrease using of pesticides.
- 3. Increase the burning of fossil fuel causes acid rain
- 4 Global warming occurs due to the increase of burning of coars
- 5. Acid rain has a bad effect on buildings in cities.

#### What happens if ...?

- 1. Mixing pesticides with water of canals and rivers. (according to the pollution)
- 2 Factories decrease using of chemicals. (according to the pollution)

rain lead o the

- 3 Falling of acid rain on buildings for a long period of time.
- 4 People decrease burning of fossil fuel. (according to the amount of carbon dioxide)

Look at the following graph that describes the percentage of cars smog in four different cities during one month, then choose the correct answer:

People in city number .....have the most percentage of eyes' diseases.

a. ①

b. (2)

C. (3)

d. (4)

2. City number ......has the least percentage of air pollution.

a. (1)

b. ②

c. (3)

d (4)



3 The most city that needs to change the type of fue to decrease the air pollution in it, is city number.

a (1)

b (2)

c. (3)

d. (4)

4 People current concrescusion signal seases in city number than in city number 1

are less

a. (1)

b (2)

c. (3)

d. (4)

## Engine of Labor

F 1			
Choose	the co	rrect	answer

- 1. We must fossil fuel at first, to obtain energy.
  - a. wash
- b. cook
- c cool

d burn

- 2. Fossil fuels need ... to be formed under the Earth's surface.
  - a five years

b. ten years

c. hundreds of years

d. millions of years

- 3. Among the following resources, we must conserve
  - a, solar energy and coal.
  - b. solar energy and wind energy.
  - c. wind energy and oil.
  - d. oil and coal.
- 4 To conserve fossii fuels, we have to do all the following actions except
  - a. replacing gasoline with natural gas.
  - b. replacing gasoline with solar energy.
  - c. replacing natural gas with solar energy.
  - d. replacing coal with wind energy
- 5. Burning of fossil fuel produces gases that ......
  - a. help human to respire.
  - b. help animals survive
  - c. pollute the air.
  - d. benfit the environment.
- 6 Burning all the following forms of fuel causes increasing the the Earth, except
  - a. solar energy.
- b. coal.
- c. oil.

d wood.

- 7. At the following sentences are related to the global warming pher omenon except
  - a changing the Earth's climate.
- b. trapping heat in the atmosphere.
- c decreasing the Earth's temperature. d increasing the Earth's temperature

- · 8. Both coal and charcoal
  - a. are renewable resources of energy.
  - b. are non-renewable resources of energy.
  - c. are examples of biofuel.
  - d preduce thermal energy on burning.

	(	Choose from column (B) what suits it in column (A)			
		(A)	(B)		
		I. Wood 2. Coal	a. it is one of renewable resources of energy, which don't pollute the air.	า	
	13	3. Wind energy	b. it is one of biofuel, that is used in warming houses.		
			c. it is one of biofuel, that is produced from corn		
		· <del>-</del>	d. it is one of fossil fuel, that pollutes the air.		
		1 2	3		
	P	ut (//) or (x) ;			
0		The amount of oil on th	ne Earth is limited.	(	)
			made from corn cannot be replaced as quickly	,	`
	3	When surning of fossil	fuel increases the temperature on Earth decreases.	1	1
		4 As a result of global warming, the temperature on the Earth increases.			,
	5		produce energy is more expensive than using	,	,
		renewable resources.	, and a superior of analy doing	(	)
ā	6.	Wind energy will run ou	ut faster than natural gas.	(	)
			Telliave to replace it with renewable resources of	· {	)
	8	Global Administration	62 10 factor of using fossil fuels in energy		
		production.		(	)
	c	orrect the underlined w	vords :		
	1	The amounts of rene			)
	2,	The amount of blofuer as quickly as it is used	nat 5.0 / (3) cannot be replaced		,
	2		roung focal fuel abusin close the air		1
			rning fossil fuel always clear the air (		)
	4		uel causes global warming (		.)
			es of energy will not run out, as they are used. (		)
			el that is used in warming houses (		.)
	7		ssil fuel on burning decrease the temperature		
		on Earth.			_)

### Write the scientific term of each of the following:

- 1 The type of the that now and a property of the series of the
- the Earth, as a result of burning of more fossil fuels.
- 3 The onorgy resources that in Jude wind energy water and so ar energy

#### There is the following sentences

such as water, . . . and

- changes its.
- trapping in atmosphere.
- 4 If people do not rationalize the consumption of Earth
  - 5 using the resources of energy is more expensive than using fossible.
- 6. To avoid air pollution, we must use resources of energy such as water, ... energy and energy.

#### Give reasons for:

- 1 The used amount of fossil fuel cannot be replaced as quickly as it is along med
- 2 To keep the air clean we must replace fossil fuel with received a sor energy.

#### What happens if ...?

- 1 People don't rationalize their using of fossil fuel.
- Using renewable resources of energy instead of fossil fuel.
   (according to Earth's temperature)

### Give one example for each of the following:

- 1. A renewable resource of energy:.
- 2. A non-renewable resource of energy .
- 3. A method of conserving fossil fuel:
- 4. A disadvantage of using fossil fuel in energy production :
- 5. An advantage of using renewable resources to produce energy:

The different forms of fossil fuel are considered as resources of	energy c	on Earth
that have some disadvantages.		

Choose the correct answer in the following questions:

- 1. If we don't rationalize using of fossil fuel, its amount will ...........
  - a. not change on the Earth.
- b, increase on the Earth.
- c. be constant on the Earth.
- d, run out on the Earth.
- 2. To conserve fossi, fuel we must do all the following actions, except
  - a. using energy-saving light bulbs.
  - b. using fossil fuel more than solar energy.
  - c. using bikes more than cars.
  - d using review use to some than fossi fuel.
- 3. Fossil fuel is characterized by all the following except
  - a, it has limited amount.
  - b. it produces thermal energy on burning.
  - c. it is a renewable resource of energy.
  - d it is a non-renewable resource of energy.
- 4. All the following resources are considered non-renewable resources of energy except
  - a charcoal.
- b. natural gas. c. coal.
- d. oil.

## **Exercises**

on Lessons of Concept (3-3)

• Analyze • Evaluate

Create

Tarrest Cit	100
Choose the correct answer:	
1 A Lof the following are examples of rer	newable energy resources, except
a fossil fuel.	b waterfalls.
c. wind,	d. sunlight.
2 Solar pane's use solar energy to gener	
houses.	
a. sound	b. electrical
c potential	d. kinetic
	which moves the windmili's blades
a. kinetic	b. solar
c. thermal	d. potential
<ul> <li>4 Both modern wind turbines and old win</li> </ul>	
a. shape,	b. ability to generate electrical energy.
c. biades number,	d. ability to generate potential energy.
<ul> <li>5 Some types of lamps depend on order to do its function.</li> </ul>	as a renewable energy tesc e
a. sunlight	b. oil
c. coal	
6 Gasoline is a non-renewable energy re	d. natural gas
a. flashlight,	b. car engine.
c. electric fan.	d. washing machine.
<b>2</b> Put (✓) or (X):	
Windmili turbines generate electricity by	using the energy of water flow. ( )
2. Machines make our life more easier.	( )
3 The low cost of the energy used in wate	rmills is from the disadvantages
of using this energy.	( )
4. Windmills can do the r job a l the time as	the wind never stops blowing. ( )
5. Both wind movement and water flow has     6. Both modern wind but his	kinetic energy. ( )
6. Both modern wind turbines and old windm     7. All devices pood appare to all the devices.	nills are used to generate electricity. ( )
7. All devices need energy to do their function	ions. ( )

3	Correct	the	underlined word	
_			we miled Mall	5

- 1. Solar panels use sound energy to generate electricity

  ( )
- 2 Watermil turbines got erate electristy by using the exercity of wind movement
- 3 Manual mixer depends on operfor by trigglife figures.
- 4 The mobilest of pied is implied by named a screen attackers

#### ( )

1

### Write the cientific term of each of the following,

- 1. A mill that is turned by water flow.
- 2. A mill that is operated by wind movement. ( )
  - There eae grant the sproduced from both electric mixer and margaint as
- 4 Attine of energy resource when oil is used it side a carengine

#### Con et : le a la sentancia

- 1 In electric on varistations, the purning coal produces ——energy is getterate ∈ ∈ 1 ... In the Lines of ——generate electricity by using the windle land
- 2 The water or generates neticlehergy which moves the of ratern are transform this energy into .......... energy.
  - 3 Both and are 190 to grains to make four hundreds or years ago, but now we use them to generate
  - 4 A thous and a sear of them can be used to generate
- 6 The electricity in a longer clated by wall it to hos is considered as energy resource, while the electricity that is generated by but any or ross, it exists considered as energy resource.

#### G ve reasons for

- 1 Humans use windmilts and watermills from hundreds of years ago
  - 2. Nowaday scientists work on inventing solar cars instead of fossil fuel cars

3. The electricity that is generated by windmills is considered as renewable energy resource.

### What happens if ...?

- 1. The wind doesn't blow in an area that contains many modern windmills.
- 2. Sunlight falls on solar panels of some street ghts.
- Put (//) in fornt of each of the following examples to show the type of used energy resource in each:

- relay resource in each :		
Example	Renewable energy resource	Non-renewable energy resource
2.		
3.		
4.		



Complete the following energy chain by using the energies below (you may use each word more than once)

(thermal - electrical - kinetic)

Burning of coal converted energy to produces move the machines of into energy electric power stations ..... energy converted that travels through into wires to houses Wind blowing produces ..... energy that moves the To operate turbines of windmills Television

	A STATE OF THE PARTY OF THE PAR
Choose the correct answer:	
• 1 in the absence of sunlight, all the fo	llowing items will be affected, except
a. plants.	b. human.
c rocks.	d. animals.
° 2. The Sun is made up of gases, mainl	ly and .
a. hydrogen – oxygen,	
b. helium – carbon dioxide.	
c. oxygen – carbon dioxide.	
d. hydrogen – helium.	
<ol><li>The two types of energy that move for</li></ol>	rom the Sun to the Earth in the form of
waves are energy ande	nergy.
a. electrical – light	b. sound – thermal
c. thermal – chemical	d. light – thermal
4. When land and water areas on Earth a	bsorb the solar energy, the increases
a. temperature on Earth	
b. speed of rotation of Earth	
c. speed of rotation of moon	
d. speed of rotation of Sun	
5 The solar energy is converted into	energy in greenhouses
a. electrical	b. sound
c. thermal	d. potential
6. Greenhouses allow farmers to plant of	rops that only grow in
	b. warm climate.
c. absence of sunlight	d. absence of water.
	food is one of the bene is
the solar energy.	
a. paper	b. plastic
c. mirror	d. wooden
8. All the following are from the uses of e	electricity generated by solar panels
except	
a. operating windmills	
b. operating irrigation equipment.	
c. lighting streets.	

d. operating calculators.

### Choose from column (B) what suits it in column (A):

6	(A)	/p\		
		(B)	1	
	,	a are two gases involved in respir		
	2 Light energy and thermal energy	b. are the two main gases forming		
	1	c. are the two main types of energ	y produced from	
	Electrical energy and thermal energy	the Sun.	l	
	Listing Citergy	d are the two types of energy proc panels.	Juced from so ar	
	1.	2. 3		
ı	Put (✓) or (x) :			
9	1. Plants need water only to	grow,	(	)
		re placed in dark areas for several v	weeks. (	)
0	3. The Sun does not have		(	)
	4. Hydrogen and helium ga	ses react with each other in the Sur	at very low	
	temperatures.		(	1
9	<ol><li>Looking directly at the S</li></ol>		(	
	6. Placing large windows on	the walls that face the Sun helps in w	arming houses (	
G	<ol><li>A solar panel consists of</li></ol>	one small solar cell.	(	
	Correct the underlined wo	ords:		
0	1. In the absence of the I gi	nt of moon, plants cannot grow.	(	)
	2. Thermatic on the Line	radicec from the S	un and	
	reach the Earth.		(11111111111111111111111111111111111111	)
	3. Earth is a star that is ma			,
		ases react with each other in the Su	n at (	,
	very high temperatures.	and to supply and light halb with ear		
	<ol><li>Small solar panels are u energy.</li></ol>	sed to supply one light bulb with so	(	1
		C. I. Cat. Call Continues	,	
ı	Write the scientific term of	of each of the following:	mittad /	1
۰		s surface where the light we see is a		
		e made mostly of hydrogen and he	ituiti (	
	gases	used to collect and focus sunlight o	nto metal pots	
	to heat them and cook the	ne food inside.	(	
3		orb the Sun to produce heat or gen	erate	
	electricity.		(	

### Complete the following sentences

- which is eaten by animals. 1. The Sun is necessary for the growth of
- 2. The Sun is a star which is mostly made up of gas and
- \* 3 Among the differences between the Sun and the moon is that the Sun doesn't have a surface, but it has a layer of gas which is called
  - 4. The reaction between hydrogen and helium gases at very high temperature in energy and the Sun produces large amounts of
- energy is a type or • 5. The solar energy is produced from the ......... , and the this energy which is carried by Sun rays.
  - 6. When we expose our bodies to the Sun we feel
- 7. We can use solar energy in cooking by using curved ........ which collect and focus ...... onto metal pots to heat them.
  - 8 Greenhouses convert the radiant energy of the Sun rays into energy that allows farmers to plant crops which grow in . ..... climates.
  - 9 Solar cells that convert rad ant energy coming from the Sun rays into ..... energy and ...... energy.
- 10. Solar cells that are found in some calculators produce ..... energy that is used to recharge their
- 11. In some villages, solar panels are used to generate \_\_\_\_. energy that is used to operate .... equ.pment.

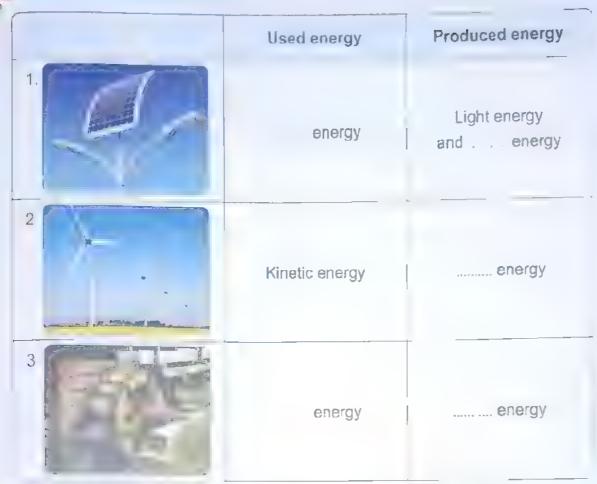
#### Give reasons for :

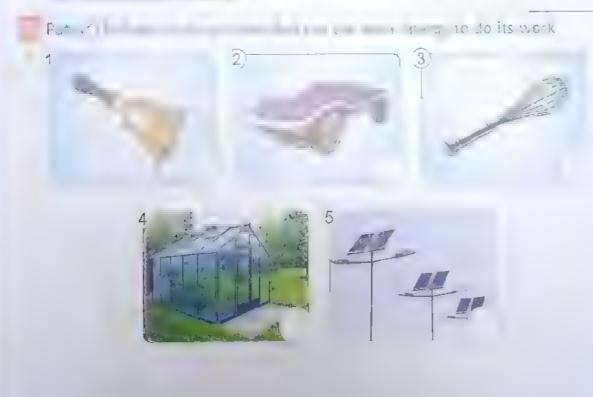
- 1. Sunlight is very important for plants and animals.
  - 2. Sometimes the Sun is not visible in the sky but you can feel its 🚾
- Some electrical devices have solar panels which are composed of

#### 8 What happens if ...?

- 1. Hydrogen and helium gases react together at very high temperatures in the Sun.
- 2. You look directly at the Sun for a long time

#### Complete the following table:





Create

#### Put (1/) or (1/) .

c. chemical

· ·			
	1. Wind is a renewable energy resource.	1	
	2. There is a sm larity in temperature between cold and not air.	(	
a	3. In wind turbines, the kinetic energy is converted into chemical energy.	1	4
	4. Electricity generated by wind turbines is transmitted through wind	(	,
,	5. When air blows into the wind turbine from the front, the blades spin quickly.	(	,
67	6. When ar blows into the wind turbine with a small force, the blades spin slowly.	(	)
	with a small force, the blades spin slowly	(	1

b. potential

d. solar

3	C	prrect the underlined words:
	1.	Potentia energy of the wind is converted into electrical energy by wind turbines.
		( )
	2	The difference in temperature between cold and hot air causes air to stop.
		()
	3.	Water turb nes rotate when the windmill blades rotate. ( )
	4	When air blows into the wind turbine from the side, the blades spin slowly
		( )
	5	When air blows into the wind turbine with a large force, the blades spin slower
		( )
	6.	When the number of wind turbine blades increases, they spin faster. ( )
	W	rite the scientific term of each of the following:
		A natural movement of air that 's resulted from the difference in temperature
		between cold and hot air.
ì	2	A mill that uses the power of flowing air to generate electricity ()
ı		An energy that is generated from windmills and is transmitted through wires to
		houses and factories. ()
	C	omplete the following sentences:
		Wind a former of the angle of the state of the entry coming from the lin the
		form of rays.
	2	The winding a control of the not air.
	3	The rotation energy that is created by
		wind movement.
	4	When the wind to both control energy is converted into energy.
Ф	5	When the wind blows in all winds its from the side, the blades rotate
		than that when the wind blows into it from the front,
0	6	When the wind blows into a windmi-with a large force, its blades rotate
		than that when the wind blows into it with a small force.
	7.	By ncreasing the rotation of windmill blades, the wind turbine generates more
		energy.
	8.	By decreasing the number of blades, the speed of rotation of turbine blades
		wiil
	9.	When the energy of the wind increases, the speed of rotation of turbine
		blades wil

### wive reasons for :

- 1. The number of windmill blades affect its efficiency.
  - . Kinet, energy affects the speed of windmill rotation
  - . The o rection of wind blow affects the speed of windmill rotation

### What happens if ...?

- 1 A coows into the windmills from the front, (according to the speed or rotation
- 2 The kinetic energy that is applied on the windmill increases

## - , tarrota fan ny ts. t

#### (Thermal - Radiant - Electrical - Kinetic - Sound)

converted converted er ergy mto From the Sur When temperature vary In wind turbines between hot and cold air 5 energy to do the main function of the fan converted converted 6 and energy. into into energies as wasted energy Carried by electric wires

1	C	hoose the correct answer:			
		Water flows through turbines in dams to	conorate onora		
		a. electrical	b potential		
		c. solar	d. light		
	2	In water turbines, the energy of wa	ator is changed into electrical	arare.	
		a chemical	b. kinetic	1 1 1 1 1	
		c. thermal	d. light		
0	3.	The reason of flowing of river water dow	nhill is the force		
		a. pushing	b. friction		
		c. gravitational	d. electrical		
¢	4	Using of water to generate electricity de			
		a. with strong winds.	b. where dams are built on r	ivers.	
		c. with weak winds.	d. where boats sail in rivers.		
0	5.	Both waterfalls and are renewable			
		a. wind	b. coal		
		c. oil	d. fossil fuel		
		ut (v) or (x) :			
	1	Waterfall and color of the tenewo	arls energy resources.	١	
p	2	Electrica in the light was partially	no h waterfalls and wind		
		movement.		(	)
0		Dams are built on rivers to control the wi		(	)
	4	The flow of water thin selden, utled to ga	nerate electricity in dams	١	`
ġ	10	orrect the underlined words:			
0			rollogo in dome to their a		
	١,	The thermal energy generated by water the hydroelectricity.	ranomes in dams is known âs	,	,
	2	During the flowing of rivers water downh	ill the chemical potential end	tav of	
	۷.	water is converted into kinetic energy.	in, the oriented potential elle	(	)
	3.	Dams are built on rivers in order to gene	rate solar energy	(	)
		The electrical energy is generated by wir		(	)
		THE CHOCK OF CHOIST TO BOTTON WY THE		1	/

- 1 A turb ne that converts the energy of falling water into electrical energy.
- 2. A type of electrical energy generated by water turbines in dams.

#### Complete the following sentences

- 1 When rivers flow downhili, energy of water is converted into energy that rotates water turbine.
- 2 People built on rivers to control the water flow and increase its energy that is converted into energy in water turbines that is used to light houses.
- 3. Dams control the flow of that causes the increase of the energy of water.
- 4 The type of electrical energy which is produced by water turbines is called
- 5 Water and are from the renewable resources of energy which use energy to operate turbines and generate
- 6. We can use a device known as wind . to generate electricity in places with strong air blowing.
  - 7. Water turbines are used to generate electricity in places which have waterfalls or . .........

#### Give reasons for :

- 1. Dams are built on rivers.
- 2. Water turbines are placed in waterfalls areas.

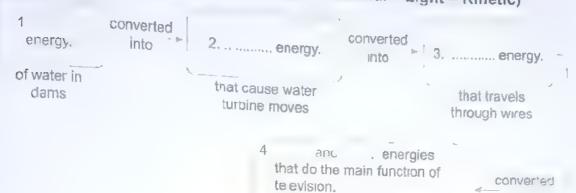
#### What happens if .. ?

- 1. Water turbines are placed in a dam
- 2. Potential energy of water increased in a dam containing water turbines.

into

Complete the following energy chain of a television by using the words between brackets:

(Electrical - Sound - Thermal - Potential - Light - Kinetic)



energy.

5. ..... energy as a wasted

Choose the correct answer	m/sec, ts kinetic
1 If the speed of moving water changes f	rom 5m/se; to m/sec, is kinetic
energy will increase.	4.6
a. 2 b. 3	c. 4
· 2 Which of the following is a renewable e	nergy resource ?
a. Running bicycle.	b. Running car.
c Running water.	d. Running person.
3 in the water cycle, waler then it	before falling in the form of rains
free∠es — evaporates	b evaporates condenses
c. evaporates – freezes	d. condenses – evaporates
4 River water evaporates by the help of n	eat produced from
a kettles.	b. the Sun.
c. electric heaters.	d. electric iron.
<ul> <li>5. The form of energy resulted from water</li> </ul>	falls is called energy.
a. thermal b. chemica	c. solar d. hydroelectric
Put (V) or (X):	
<ul> <li>1. Waterfalls are non-renewable energy re-</li> </ul>	sources. (
<ul> <li>2. Running water in rivers has kinetic energy</li> </ul>	gy. ( )
3. The energy produced from wind turbines	s is known at the companergy. (
4. The evaporated water from rivers can ret	
Arite the scientific term of each of the fo	Horing.
1. A turbine in which the kinetic energy of r	moving water is used to
generate hydroelectric energy.	(
2. A process in which water changes into w	vater vapour. (
3. The evaporation and condensation of riv	ver water, then returning
back to rivers through rainfalling	(
Complete the following sentences:	
Renewab e energy resources includes	, and
<ol><li>The movement of water in river is used to electricity.</li></ol>	o rotate the water to generate

- 3. Both wind and water movement produce energy that is used to rotate turbines to generate ...... energy.
- 4. Clouds are formed due to the then of water of rivers and seas.
  - 5 In water turbines, the energy of water movement is converted into a type of electrical energy which is called ....... energy.
- Give a reason for the following:

  Some dams contain water turbines.
- What happens if water of seas and rivers evaporates then condensates in the atmospheric air.
- Look at 11 of the that represents the water cycle, then complete the sentences below:



- 1. The arrow number ( ) represents the evaporation of river's water.
- 2. The arrow number ( ... ) represents the condensation of water vapour to form clouds.
- 3 The arrow number ( ) represents the falling of rain that make water return back to the river.
- 4 The arrow number ( ) represents the water movement in waterfall that makes the watermill rotates.



### Self-Assessments

on concept (3.1)

-211	7	ari lim	
------	---	---------	--

### (A) Put (V) or (X):

- 1 The solar vehicle changes sound energy into kinetic energy.
- 2. Mars rover curiosity can be operated from a distance.
- 3. The stored energy in batteries is the light energy.

#### (B) Give a reason for the following:

Curiosity robot uses the sunlight and batteries for its operation.

### 

- 1. The main source of energy on the Earth.
- 2. The form of energy that is stored in pattery of a remote controlling toy car.
- 3. The remote controlling vehicle that is used to explore the surface of flars planet.
- (B) Mention two devices can be operated from a discontrol.

#### Look at the opposite figure, then choose the correct

- 1. This car needs ..... to move.
  - a. water
- b wood
- c. fuel
- d energy
- 2. To keep playing with the toy car when the battery runs out, we have to or recharge the battery.
  - a heat
- b cool
- c replace
- d freeze
- 3. The type of energy that is used in operating this car is ... energy.

- a sound
- b light
- c thermal
- d. electrical

# But Anna 8 But and

#### (A) Complete the following sentences:

- 1. When you rub your hands together the consumed energy is ..... energy, while the produced energy is ..... energy.
- 2. The produced energy in a toy car is energies in a hair dryer are energy and sound energy

energy, while the produced

3. The produced energy from coal is energy, that is converted into energy used to operate the mach nes of electric power stations

#### (B) Give a reason for the following:

The thermal energy produced from burning coal is used in some electric power stations.

#### (A) Put (V) or (X);

- 1. Curiosity robot needs sound energy to be operated.
- 2 The electric amp is the primary source of most energies on the Earth.
- 3 The electric iron converts electrical energy into thermal energy.

#### (B) What happens if ...?

You press on the spring of the soap dispenser.

(according to the change of energy).

#### Looka

#### The end the following sentences:

- 1. This I ving organism can converts ...... energy of the Sun into energy stored inside it.
- 2. If the wood of this organism is burned, energy is produced.
- 3. After death and burying of this organism over millions of years, it becomes coal that stores energy.
- 4. The formed coal can used in electric power stations to generate energy.



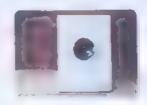
	British a server	9	
8	A     1		
	1 Mars rover currosity uses	to be operated.	
	a solar energy and electrical er		
	b solar energy and thermal ene		
	c electrical energy and thermal		
	d. electrical energy and sound e		
2	2. While playing a drum,		energy.
	a sound - kinetic	chorgy changes who where	
	b sound - light		
	c kinetic – sound		
	d kinetic - light		
3	n the bicycle, the kinetic energy friction of its tires with the road.	is converted into	energy due to the
	a sound	b. thermal	
	c light	d. chemical	
(	B) What happens if ?		
	ou rub your hands together.	(according to the	ona te Henergy)
	to transcribe and to be according to		
	Energy son solther he erected a	or done and but are	,
1	to another, this is the law of cons		· e form
2	The consumed energy while bur	ning some pieces of wood is	the thermal
	energy.		(
3	The lighted lamp produces chem	nical energy that makes you f	eel warmth wh <b>en</b>
	you put your nands near it.		(
(E	B) Mention two devices that conv	ert electrical energy into bo	th kinetic and
	sound energy		

## Lillook at the following figures then complete via foncesing sentence:









72,16

Device (2)

Dévice (3)

Device (4)

- 2. Kinetic energy is produced in devices . . . . and

## 10

#### (A) Complete the following sentences:

- The output energy of burning coal is energy, which is used to produce energy in electric power stations.
- 2 The output energy that helps the washing machine to do its main function is energy, and this energy is considered the ...... energy of the hand bell.
- 3. The input election of the log car is energy that is stored in its battery and then notice it is to energy in its wires to operate its motor.

#### (B) Give a reason for the following:

Sound energy in the energy in the washing machine.

C 2 2 2						
A.	Jurtoin	f	of term	of each	of the	following

- 1. The input energy of a television.
- 2. The wasted energy of a computer ( )
- 3 The output energy of the washing machine which helps it to do its main function.

- B. Mention the input was rated in in a fifth opposite device
- 1 Input ener IV
- 2 Octo Leneiny



### le on a recorded to de cos then complete the for any green co.



Device (1)



Device (2)



Device (3)

370 795

- 1 Sound and light energies are produced in the device number it to do its function.
- 3 Noise from devices number and sound doesn't help the devices functions.
- 4. All of these devices are operated by energy that is transmitted from . . . stations through wires.

is wasted energy decause

## **Model Exam**

on concept (3.1)

Total mark
20

1	(A)	Choose	the	correct	answer	h.
						h

(5 marks)

1.	Mars	rover	curiosity	is	designed	to	explore	
----	------	-------	-----------	----	----------	----	---------	--

a. Earth planet.

b. Mars planet.

c. the Sun.

- d. the moon.
- 2. Plants can convert the light energy from the Sun into is stored inside the plant in the form of sugar.

energy which

- a. sound
- b. electrical

c. chemical

- d. kinetic
- 3. When a piece of coal is burnt, ... energy is produced.
  - a. thermal

b. kinetic

c. sound

- d. potential
- 4. Inside a light bulb, electrical energy changes into

and

energies.

- a. sound light
- b sound thermal
- c. kinetic light
- d. light thermal

... c by ited lamp?

(A) Put (V) or IX	(5 ma	arks)
1. There is a stored or	emical energy inside the food we eat.	)
2. The input energy in	a hair dryer is the chemical energy. (	)
3 As a result of friction	n between bike's tire and the road, kinetic energy	
changes into chemi	cal energy. (	)
4 We can convert the	solar energy into different forms of energy. (	)

(B) Look at the following figures, then complete the following energy chain . Faure (1) Fig.re (2) Figure (3) Figure (4) Figure (5) Chemical energy Energy in Figure converted Kinetic energy and converted stored in figure Inermal energy n nto into figure ....... Thermal energy that is Electrical energy that converted converted produced from the device is travelled through into into in figure ..... figure ... ... (A) Correct the underlined words: (5 marks) 1 Light energy is stored inside the battery of a mobile phone 2. Toy cars depend on fue, as a source of electrical energy. 3. Light energy, thermal energy and chemical energy are produced there mobile phone is used. 4. The solar energy produced from the moon can be converted into c forms of energy. (B) Give a reason for the following: When you press on the spring of soap dispenser, the soap moves upward (according to the change of energy).

### (A) Write the scientific term of each of the following

- 1. The energy that is used to operate a television
- 2. Energy can neither be created nor de droyed, but only converted from one form to another.
- 3. A kind of energy that is produced from the electric heater and burning coal.
- 4. The energy produced from playing guitar.
- (B) Chaose from column (A) what suits it in both columns (B) and (C).

(A)		(B)	(C)
Energy used	<del></del> .	The device	Energy Produced
1. Kinetic energy	а		A. Thermal energy.
2. Electrical energy			B. Chemical energy.
3 Solar energy	С		C. Sound energy.

## Self-Assessments

on concept (3.2)

## S-II Akki i Des-II (11) en Lessen (1 1. To move a car, the fuel must be . ..... at first. (A) Choose the correct answer: burned inside the car eagline removed from the fuel tank b. cooled 2 During driving a car for a long distance, which of the following sentences describes the most important thing for the driver? a The presence of a speedometer. The presence of a radio. c. The fuel tank contains enough amount of gasoline. d. The fuel tank contains a little amount of gasoline. 3. On burning fuel we obtain ..... b potential energy a. sound energy. d. thermal energy. c. electrical energy. (B) Give a reason for the following: The importance of wood and coal in our houses. (A) Put (V) or (X): 1. Energy that is produced from burning gasoline, cannot be used to move a car. 2. Burring of a forms of fuel produces therma, energ-3 If the fuel decreases in a car during driving, the drive. The couplet the nearest fuel stat on to supply the car with gasoline (B) Mention three different forms of fuel. Put each of the following words in front of the suitable sentence [The Sun - Wood - Gasoline - Thermal energy] 1 It is a form of fuel that is used in different means of transportation. 2 It is a form of fuel that is used in warming houses. 3 It is a form of energy which is produced from burning fue. 4. The main source of most energies on the Earth's surface.

## 12 In Lines !

## (A) Choose the correct answer:

- 1. Car engines can be operated by
  - a, coal only.

b. coal and wood

c. gasoline only,

- d gasoline and natural gas.
- 2 The fossil fuel are formed under the Earth's surface from dead plants of animals, after a ...... period of time.
  - a, very short
- b short
- c. very long
- d. long

- 3. The two main types of fuel are
  - a. wood and coal.

b water and wind

c. the Sun and the moon.

d fossil fuel and biofuel

## (B) Give a reason for the following:

Biofuel is considered as a renewable fuel.

### (A) Put (V) or (X):

- 1. Coal can be used to produce electrical energy.
- ( )
- 2 Coal gasoline and wood are considered as renewable resources of energy
- 3 The non-rene vable resources of energy include coal, gasoline and water
- (B) What happens if ...?

Manne organisms of years and an experied under the Earth's surface over millions of years

## Chocs\* Commn (A)

#### (A)

#### Form of fuel

#### (B)

#### We can get it from

- 1 Wood
- 2 Gasoline and natural gas
- 3 Coal
- 4 Liquid b ofuel

- a, wood chips and grass.
- b cutting of trees.
- c. decomposition of marine animals
- d. decomposition of plant remains.
- e. boiling water.

1

2.

3.

4

PART	13 211 - 111	
c the tubes.  3. The generator inside the electrical energy into kinetic energy into electrical electrical energy into electrical electri	d. cool the fuel.  r station which operated by steam are b. the turbines. d. the cables. c power station, turns b. steam into water. energy.	T - + > + x + ( + x + z + z + z + z + z + z + z + z + z
(B) What happens if?  An electric generator in a power s	tation is damaged.	
<ul> <li>(A) Put (v) or (x):</li> <li>The function of turbines in electing generators.</li> <li>2. Turbines convert kinetic energy</li> <li>3. The electrical energy that is process to be used in houses, streets</li> </ul>	bauced from electric power station	( )
those between brackets:  1 Fosc I fuel are [non renewable - used to generate electrical energy.]	nces by choosing the con-  renewable] resources of energ,   rgy.  ons are operated by the effect of [ster	
stations Put each of the following	lectrical energy. (	ower ence : , ) , ,

	14
(A) Choose the correct answer	
When carbon dioxide gas increase     a. decreases slowly.     c. decreases fastly.	b. increases slowly
2. All forms of fossil fuel are formed	d. doesn't change.
c above the Earth's surface.	d. in the air around us
3. We have to protect stones of buil	dings from

a. global warming,

b. oxygen gas.

c acid rain.

d, carbon dioxide gas.

## (B) Give a reason for the following:

Burning of coal and oil causes the increase of the Earth's temperature

### (A) Put (V) or (X):

- 1. Acid rain causes global warming.
- 2 Mixing of water with oxygen gas produces carbonic acid.
- 3 Acid rains have necative effects on both soil and water of canals.
- (B) What happens if ...?

Some people live in a city that has too much cars smog.

(according to the human health).

arknow the bad effects of some different Scientists do se sources of pomach, in the 2000 of his living organ sms.

Match each experiment with its correct observation:

-	The experiment	The observation
L	1. Exposing a dog to cars smog for a	a ts eaves tim brown and twide
	few minutes	
	2. Placing a building stone in a cup	b. rritation of its eyes and lungs
	contains a sample of acid rain for	
	a long period of time	c t will decompose into small rocky
-	3. Watering a small plant with acid rain	
	for a week	particles

2.

3.

101

	- ALLEN	15	
1. The energy		the formation of the non-renewable fue	S
a wind end c. solar end 2. As the time a. increase c. remain of a only gas b. only the c gases the	ergy. ergy. e passes, the amount o	b. water energy. d. electrical energy. f coal will b. decrease. d. increase then decrease.	
	ason for the following il fuel causes g obal wa		
forms of fu 2. Burning fo	e forms of fuel can be rulel.  ssr fuel produces gase  bal emits gases which c	eplaced faster than non-relieve e s that don't cause global was rig ause air pollution.	( (
The amount of to very high li	of gases produced from imit.  e following paragraph	burning of fossil fuel increases  (according to Earth's temper  by using the following words .  heat – raises – gases]	eratur
	antages of using fossil fu	uel is that when it is burned, it emits apping in the atmosphere, which	

the temperature on the Earth, that causes , phenomenon.

## Model Exam

on concept (3.2)

tona dia fili		1 20
(A) Complete the fol		
1 Some forms of fue		
and		
2. The electric general	ator changes energy into	energy.
3 Using the	resources of energy is more expens ve the	37. 31 - 5 12 f255
fue!.		
4 Different forms of t	uel can be classified into two main types which	ur are
and		
gy Chaos.	The what suits it in column (A)	
(A)	(B)	
1. Water	a. it needs extreme heat and pressure to	o be formed
2. Wind energy	from remains of dead plants.	
3. Coal	<ul> <li>b. it is the main resource of energy on the surface.</li> </ul>	ne Earth's
	c. it is a gaseous renewable resource of	
	d. it is a liquid renewable resource of en	ergy.
1	2	
(A) Correct the unde	·lined words :	1 2
1 Fuel is the in .	cuces electrical energy on burning.	( )
2. Wood is a form of	fossil fuel, that can be used in houses.	(
3. Hydroelectricat er	S	
and dams.		()
4 Gases emitted fro	m burning fossil fuel always clear the air	(
(B) What happens if	2	
We use resourable re	occurred of energy instead of fossil fuel	

(according to Earth's temperature)

Ti.	A Put (V) or (X		e* 44
	I. Wind energy will run out faster tha	n natural gas.	{
ŝ		in the transport of the	(
3	B. We can make liquid biofuel from w	rood chips and grass.	(
J	As a contract	his contraction were a procession	(
		moderne to the state of the	frhe /
	to the standard to the	in an arrow of the	
{	) Steam turns turbines that prod		
(	) Fuel burns and produces them		
(	. ) Electrical energy sent to house	es and factories.	
-{	) Water becomes hot and produc	ces steam.	
(	) Turbines turn generator that pr	oduces electrical energy.	
	A) Choose the correct answer:		75 marks
	The laterman under the Earth's s	urface from the remains of	
	a. dead animals.	b. dead plants.	
	c. dead humans.	d. dead insects.	
2	Among the following resources, we		
-	a solar energy and coal.	b. solar energy and wind energy.	
	c. wind energy and oil.		
-	A this is own are found deeply a		
_	a. natural gas.	b. coal.	
	c. green plants.	d. oil.	
Ŀ	A trigito forward are used to general		
	3 C	b. naturai gas.	
	. Waterfa s	d. ra n water.	
	. War ta v	a. ian water.	
18	Given a reason for the following		

Cutting trees to obtain wood has negative effects on the environment

## **Self-Assessments**

on concept (3.3)

A second	74	C 1		
		b I	Contract of the last	
	2/4	1	the Country of	

		" took	
1	(A) Choose the correct answers	ver :	
سلس	1. The solar panels use solar light up lamps of light pos	Operation in the second	
	a. thermal	b. kinetic	
	c. electrical	d. light	
	2 All the following are cons	idered as non-renewable energy resources	
	except		
	a. coal.	b. watermills.	
	c. natural gas.	d. petrolum.	
	3 Windmill turb nes general following devices except	te electricity that can be used to operate a tre	
	a, television.	b. blender.	
	c. hair dryer.	d. hand bell	
	(B) Give a reason for the fo		
	Modern watermills contain	urbines.	
2	(A) Put (V) or (X):		
	1 Electricity that is product	eg from watermill turbines is considered as esource. ( )	
	ANALY ROOM IFOO	ted by batteries that are considered as renewable  ( )	
	3. Hundreds of years ago, p	eople used windmills to grind grain to make flour. ( )	
	(B) What happens if?	to make dries IID	
	The water supply that surro	unds some modern watermills dries up	

# Look at the figure, then complete the following sentences:

- Device number 1 represents a
   which depends on the energy produced from
  the
- 2. The energy used to operate a device number (1) is considered a ...... energy resource
- 3. Device number (2) produces ... energy and .... energy.



## Selfa seesment (17

(A)	(B)
1 Wandmil's 2 Solar panels 3 Watermills	<ul> <li>a. generate electricity by using the kinetic energy of running water.</li> <li>b. generate electricity by using sound energy</li> <li>c. generate electricity by using solar energy.</li> <li>d. generate electricity by using the kinetic energy of moving air.</li> </ul>
4	3.

#### (B) Give a reason for the following:

You shouldn't look directly at the Sun.

## (A) Correct the underlined words:

- 1 The stove uses natura gas which is considered as a renewable energy resource.
- 2. We can use straight mirrors to direct sunlight onto metal pots to neat them for cooking.
- 3. Windmill turbines convert kinetic energy into light energy.

#### (B) What happens if .. ?

Radiant energy that comes out of the Sun enters the greenhouses.

## took at the opposite picture, then complete the following sentences:

- 1. The name of this glass building is
- 2. The idea of working of this building depends on receiving the ...... energy from the Sun.
- 3 The received energy is converted into ..... energy that warms the interior of this building.



18

## (A) Complete the following sentences:

- Radiant energy is used to generate electricity directly by using
   Indirectly as it causes
   blowing that is used to rotate windmis.
- 2. A windmi. spins faster by decreasing the number of its
- 3 The energy that is produced from modern wind turbines and old windmi is so considered as ...... energy resource.

### (B) Give a reason for :

Farmers use gree and to plant crops that grow in warm climates.

2	(A)	Put	$\langle \nu' \rangle$	or	(X)	n a
---	-----	-----	------------------------	----	-----	--------

- 1 Solar panels are used to generate sound energy in light posts
  - 2 When the kinet.c energy that is applied to the wind turbines increases they produce more electricity.
  - 3 Both solar panels and natural gas are from renewable energy resources. (

#### (B) What happens if . . ?

The number of windmili blades increases.

If the two windmills in front of you are affected by the same wind force, Answer the following questions



Windmill (B)

1) nich windmill spins faster? Give a reason for your answer).

2. Which windmill generates less electrical energy?

19

## (A) Choose the correct answer:

- 1. A nen the wind turbine rotates, the energy of moving air chances into energy.
  - a. electrical

b. light

c. chemical

- d. potentia
- 2. At the following can be done by the effect of solar energy exis
  - a. warming houses.
- b. cooking food.
- c. producing sound from a hand bell.
- d. producing light from a light post.
- 3 Water turbir es can generate more e ectricity by increasing the energy of water that is stored in dams.
  - a hont

b sound

thermal.

d. potential

#### (B) Give a reason for the following:

Water turb nes are used to generate electricity in dams.

	write the scient fic term of each of a
	(A) Write the scient fic term of each of the following
	A building that is built across rivers in control to water to and
	Abuilding that is used in cold areas to plant crops which grow in warm climate.
	3. An energy that is produced from water turbines and is transmit a series to ophicate d'illerent devices in houses
	energy to be operated then ment or the
	Changes of energy:
	2. Device (2) :
	Changes of energy:
1	years ago the little li
	1. Stored water behind this dam has potential energy.
	2. The flow of water through this dam can be controlled.
	3. When water is released, it flows through wind turbines in the dam.
,	4. When turbines rotate in the dam,
	an electrical energy is generated. ( )
	20
1	(A) Correct the underlined words:
	1 The energy that is produced by wind turbines is called hydroelectric energy.
	2. Wind turbines produce more electricity when the wind blows from the front of its
	blades ( )
	3. Greenhouses convert radiant energy that is come from the Sun into light energy
	that is used to plant crops which grow in warm climates. ( )

#### (B) What happens if ...?

The number of wind turbine blades decreases.

3	(A) Cross out the odd word:	(
	1. Water - Wind - Coal - Sun.	
	<ol> <li>Water – Wind – Coal – Sun.</li> <li>Solar car – Hand mixer – Solar panel – Greenhouse.</li> <li>Windmill.</li> </ol>	former.
	3. Gasoline - Coal - Natural gas - Windmill.	6. 94
	3. Gasoline – Coal – Natural gas – Windmill.  (B) Compare between water turbines and solar panels in Solar panels.	nels
	Water turbines	
	PO.C Water to	

P.O.C	Water turbines	
Source of energy that is used to operate it:		. ———
		energy and
2. The produced energy:	energy.	energy.
E. THE PLACE OF SHALES		

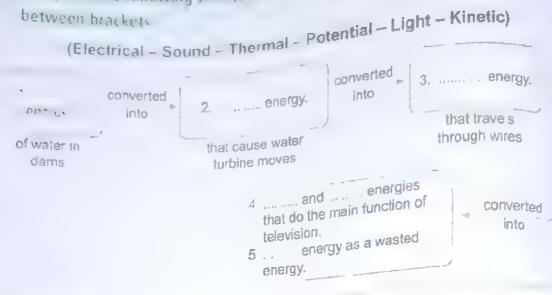
## 100 Look at the figure, then put $(\checkmark)$ or (X):

- 1. Water in the area (A) can be used in rotating water turbines.
- 2. Water in the area (A) has no kinetic energy.
- 3. Water in the area (B) may evaporate in the presence of sunlight.
- 4. When water evaporates in both areas (A) and (B) it never return back to the river.



Model Exam	
on concept (3.3)	T
	20 .
A) Wite the scentific term of each of the following	(6
1. Main energy which is produced from both electric mixer and manua	I mixer.
	,
2 Huge bodies in the space made mostly of hydrogen and helium gas	Ses .
that uses the power of flowing air to gonerote -1.	
3 A mill that uses the power of flowing air to generate electricity. ( 4. A turbine in which the kinetic energy of moving water is used to gen	
hydroelectricity.	
	)
(B) Give a reason for the following:	
pams are built on rivers.	
(A) Correct the underlined words :	(5 marks)
1. Thermal energy and sound energy are produced from the Sun and	reach the
Earth. (	·····)
2. When air plows it to the wind turbine with a large force, the blades s	sp'n sower
1	
3. Solar panels use sour to the goal to generate electricity.	1
4. During the flowing of riva 's water downhill the chemical potential e	
water is converted into kinetic energy.	
(B) What happens if ?	
You look directly at the Sun.	
**************************************	
A) Due (c. c) c c	5 - 3 45
(A) Put (V) or X, :  1. Both wind movement and water flow has kinetic energy	( )
2. The Sun does not have a solid surface.	( )
3. Wind is a renewable energy resource.	( )
4. The flow of water can't be controlled to generate electricity in dams	,

(B) Complete the following energy chain of a television by using the words between brackets



400					
1	San 1	( · · · · ·	11	orrect	answer.

- 1. In the water cycle, water ..... then it ..... before falling in the form of rains.
  - a. freezes evaporates
  - b. evaporates condenses
  - c. evaporates freezes
  - d. condenses evaporates
- 2 The solar energy is converted into . energy in greenhous

a. electrical

b. sound

c. thermal

- d. potential
- 3. The reason of flowing of river water downhill is the ..... force.
  - a. pushing

b. friction

r, gravitationa.

- d. electrical
- 4. Some types of lamps depend on . .... as a renewable energy resource in order to do its function
  - a sunlight
  - b petrol
  - c coal
  - d. natural gas

## (B) Complete the following table :

	Used energy	Produced energy
	energy	Light energy and energy
2	Kinetic energy	· ······ energy
3	, energy	energy

## Model Exam

on Theme (3)

[	-	-	1	11	Į:
	-	1	_		1
L	-	3	Ó		

Told.

(5 marks energy stored in its batteries into

(5 marks)

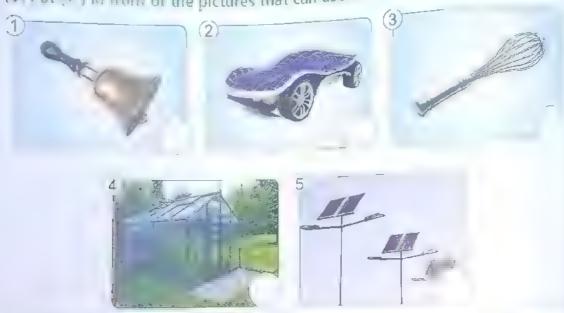
energy which is used to move

energy is converted into

## (A) Complete the following sentences:

- Remote controlled toy cars changes .... energy that in turn changes into ... the car
- 2. When you rub your hands together, the energy.
- 3. Coal, ...... and ..... can be used in generating electricity.
- 4 Among the differences between the Sun and the moon is that the Sun doesn't have a ...... surface, but it has a layer of gas which is called

(3 Put (7) in from of the pictures that can use solar energy to do its work :



[ (A)	Put	(V)	01	(X)	8
-------	-----	-----	----	-----	---

- 1. We have to reduce the usage of the Sun as a source of energian
- 2. As a result of global warming, the temperature on the Earth incleases.
- 3. Both wind movement and water flow has kinetic energy.
- 4. In the soap dispenser, potential energy changes into kinetic energy.

### (B) Give a reason for the following:

The importance of generators in electric power stations.

(A) Write the scientific term	n of each of the fol	owing	
A panel designed to abso	irb the Sun to produc	e heat or generate e entr	not.
			ICE /
2. It is any substance which	r produces thermal e	energy on burning	,
3 A robotic vehicle which is	s designed to explore	e the surface of Mars (	,
4. The energy used to play	a drum.	(	)
(B) What happens if ?			····)
Fuel runs out in a car		(according to the car r	novement).
(A) Correct the underlined	words:		
1. The Moon is the primary		uel and fossil fuel. (	
2. Manual m xer depends	on electricity to do its	function. (	
3. After death of living orga	anisms, their remains	s are buried under	
tne Earth's surface and	exposed to extreme	pressure and cool. (	
4. Wood is one of fossil fue	el that is used in war	m ng houses. (	)
(B) Choose	stats it in col	umn (A) .	
(A)		(B)	
1. Hydrogen and	a are two gases in	volved in respiration pro-	cess.
2 Light energy 3	are the two main	gases forming the Sun	
thermal energy		types of energy produce	ed from
3. Electrical energy and thermal energy	the Sun.	s of energy produced fro	ım solar
2 7 67	panes.	. c. dildigy produced ito	T. Cont.
1.	2.	3.	

Final Examinations

Model Exams On The Second Trans



## Model Exam (1)

1	the correct answer ;		
1	Choose the correct answer:  1. Toy cars need energy to do all the following functions, except		
1	a moving forward and backward. b rotation in a circle.		
	c. moving right and left. d. rotation around the moon		
	c. moving right and left. d. rotation around the moon. 2. Collisions usually produce		
	2. Collisions de la constantina della constantin		
	a. solar energy.  b. sound energy.		
	c gravitational potential energy. d chemical potential energy.		
	Among forms of ider that present in car fuer stations are		
	a. gasoline and wood. b. natural gas and coal.		
	c. wood and coal.  d. gasoline and natural gas.		
	All of the following are examples of renewable energy resources, except		
	a. fossil tuel. D. waterialis. C. Wind. d. sunlight		
	5. A very big truck needs to move.		
	a. very small engine b. small engine		
	c. very big engine d. no engine		
1	Put (V) or (X):		_
اد	1. You need gasoline to move a bicycle.	1	
	2. A solar panel consists of one small solar cell.	1	- /
	3. Most of energy chains start with the moon.	1	,
	4. We cannot create a new form of energy, and also we cannot destroy	ų.	)
	an existed form of energy.	1	١
	5. Some of kinetic enough changed during collisions of balls in Newton's		/
	cradle into sound and thermal energies.	-{	1
		`	-
	(A) Write the scien . Reach of the following:		
4	1 A device used to convert electrical energy into light energy		1
			,
	2 Natural resources of energy, that take a short period of time		1
	to be renewed .		'
	3 A natural movement of air that is resulted from the difference		١
	In temperature between cold and hot air.		)
	4. The energy produced from a battery		)
	(B) Give a reason for the following:		
	We must turn off lights that we are not needed for a while.		

## Model Exam (2)

		hann at	
	4	hoose the correct answer:  The input energy when using the his	energy.
	1.	The input energy when using the n	b. potential
		a. electrical	p. por
		c. kinetic	d. thermal
	2.	C. kinetic  Water flows through turbines in dar	ns to generate
		a. electrical	D. Poterius.
		c. solar	d. light
	3.	Fossil fuels need to be form	ned under the Earth 5
		a. five years	b. ten years
		c. hundreds of years	d. millions of years
	4.	If the angle of inclination of the road	increases, the kinetic energy of an object
		moving downward on it, will	
		a. decrease.	b, increase.
		c. remain as it is.	d. be destroyed.
	5.	The steps of forming fossil fuel, dor	of the remains of the living
		organisms.	
		a. decaying	b. cooling
		c. burying	d. heating
			=
l	Co	omplete the following sentences:	
		The energy changes into	energy when the figure is cradle ba
		moves towards the rest of balls.	
	2.	Both and are used	to grind grains to make flour fundreds of
		years ago, but now we use them to	generate
	3	In any energy chain, some of the el	nergy is lost in the form of
	4.	Wood and are examples of	biofuel, while and are
		examples of fossil fuel.	
	5.	When you ride a bicycle, the	energy stored in your body is converted
		into energy which cause th	e bicycle to move.

# (A) Look at the following figures, then put (J) or (x):







car (2)

1. The movement of the two cars can be controlled from a distance by using a remote control.		
2. Car (2) use sunlight to move.	(	)
3. The two cars can convert the chemical energy stored in their batteries into electrical energy.	(	j
4. We can use an electric cable to recharge the battery that s placed in car (1) again if it runs out.	(	)
(B) What happens if ?	(	)

The arbags in a car don't inflate during a crash.

## Model Exam (3)

	and of a car and it stops						
Choose the correct answer.  1 When the fuel is completely consumed during the moving of a car and it stops  1 work  2							
a. speed. b. kinet  2. Electric wires are made a. copper. b. carb	of						
<ul> <li>hydrogen – oxygen.</li> <li>oxygen – carbon dioxi</li> <li>When the objects collide</li> <li>a time</li> <li>b dista</li> </ul>	de. d hydrogen - normal is transferred between them, with each other. d. nothing						
Hydroelectric energy, is a     Small solar panels are use	s have a light energy.  icle that is designed to explore the surface of moon.  in the surface of moon.  icle that is designed to explore the surface of moon.  icle that is desi						
(A) Choose from column (B	) what suits it in column (A) :						
(A)	(B)						
a. It is one of the safety equipment in cars, that is inflated with a gas during crashes.  b. it changes its sound energy into light energy.  c. it is used to hit a ball during playing.  d. it is one of the safety equipment in cars, that keep passengers in their places during crashes.  e. it is used to hit a wall during destruction of a build							
1 2	3. 4						
(B) Give a reason for the fo	llowing : uel cannot be replaced as quickly as it is consumed.						
The used amount of lossif it	as quickly as it is consumed.						

## Model Exam (4)

() Ch	noose the correct ar	iswer :				
1 All the following are renewable energy resources except						
	a. waterfalls. b.	coal.	the Sun.	d. wind.		
2	To stop the moveme	ent of an object.	zou can colude It	with another	object that	
	nas from th	e opposite direct	ion.			
	a. much more kineti	ic energy b	. much more the	ermal energy		
	c. much more light	energy d	l. much more so	und energy		
3.	Hydroelectric energ	y is generated from	om			
	a. waterfalls only.	b	, waterfalls and	dams.		
	c. biofuel only.		I. biofuel and fos			
4	Both hair dryer and	electrica water i	kettle produce	energy	/	
			. light	,		
	Some electric device					
	a. electrical b.	thermal c	. potential	d. sound		
	rite har is the					
1	A process in which	water changes in	ito water vapour.		(	
2.	The iquid that store	s chemical energ	y, and tis used	to move cars	, 1	
3	A fue that is produc	cec from remains	of dead animals	s and plants		
	under the Earth's si				(	
4.	It is a device that pr	oduces light fron	n electricity.		(	
	The wasted energy	7		a long time		
_	, no vaoita e o j,			iong arro.	,	
(A)	Complete the folio	wing table :				
		Used er	nergy	Produce	d energy	
1	Constant !	er	nerav I	Light 6	energy	
			3,	and	energy	
	The state of the s					
2.	Anna Jana	e	nergy		energy	

(B) What happens if ...?

The charge of remote controlled toy car batteries is running out.

## Model Exam (5)

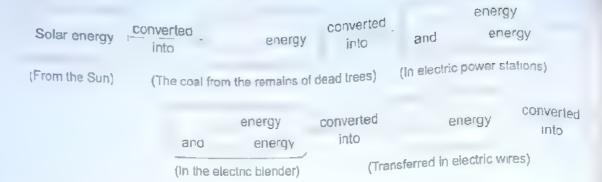
3	C	hoose the correc	t ancumer :						
	*	Then the set the hand hell the energy changes file so it is energy							
		a light	h thornal	- kingtic	C. electrical				
	2	cs no runed	Shoots in eq.	aking food is one	of the benefits of using the				
Sheets in cooking food is one of the benefits of solar energy.									
		a paper	b plastic	c. mirror	d, wooden				
	3.	Collision usually	include	0,1,11					
		a. energy creation	On only						
		b. energy creati	on and energy des	truction.					
		c. energy transf	erring only	ill disklotti					
		d. energy transf	erring and energy	transformation.					
	4	River water eva	porates by the nel	n of heat produce	ed from				
		a. kettles.	-,	b. the Sun.					
		c. electric heate	ers,	d. electric iron.					
	5	. Extreme heat a	nd pressure under	the Earth's surfa	ce has an important role in				
		rorming	h						
		a. wood.	b. wind.	c. fossil fuel.	d. biofuel.				
	P	out (🗸) or (x) :							
			iter object has muc	sh kinatic priece.					
			ed chemical energy		-				
			our life more eas		( )				
			ators depend only		n anout a collision				
			by asking the two		( )				
	5	. We have to cor	nserve all forms of	fuel.	( )				
٠	-	(A) C	£ 11						
-			following senten						
	<ol> <li>When we expose our bodies to the Sun we feel</li> <li>The energy can be from one form to another.</li> <li>The moment where two objects hit or make contact in a force of which is called</li> </ol>								
	4 By increasing the mass of a car that moves down a ramp, its kinetic energy with a so the time it takes to cover the same distance will								
	(B) Give a reason for the following:								
	8	Sunlight is very in	nportant for plants	and animals.					

## Model Exam (6)

Choose the correct answer:							
1. Ancient p	eople u	sed	as a f	form of fu	el, before	discovering	g gasoline
a. electric	city	b. water		c. wind		d. wood	
2. Oil is a n	on-rene	wable ene	ergy reso	ource that	t is used i	nside a	
a. flash li	ght.	b. car eng	gine.	c, e ectr	ic fan.	d. washing	machine.
3. It takes s	evera	foi	r a space	ecraft to t	ravel from	n Earth to M	lars.
a. secon	ds	b. minute	S	c. days		d. months	
	You feel warm when you rub your hands together, because energy changes into thermal energy.						
a. kinetic	;	b. light		c. electr	ical	d. sound	
5. When a	car stop	s suddenly	y, the pa	ssengers	move		
a. backw	/ard.	b. forwar	d.	c. upwa	rd.	d. downwa	rd.
		4 1					
Correct the							
1 Fast and	i neavy	object has	s more p	otent al e	nergy tha	n a slow an	d ight object
	47 . 4 4						(
2. Watermi		-	te electr	city by us	sing the el	nergy	(
	of wind movement.					( )	
3. Earth is a star that is made of gases.						(	
4. We need sound energing at comes from the Sun for cooking foods							
and war							()
5. Fossil fu	iel inclu	de oil, coa	l and wo	od.			()
(A) Use the following the word more than once):							
(Thermal – Chemical – Kinetic – Electrical – Sound – Light)							
1. The energy chain of burning some branches of a tree :							
Solar	energy	converted nto		energy	converted into	and	energy energy
From .t	ie Sun		Stored in	side the tree	)	(When Lurn	DOWN TO DIT



## 2. The energy chain of electric blender.



## (B) What happens if ... ?

Two bicycles move in an opposite direction, collide with each other.

## Model Exam (7)

Choose the correct answer:						
On a flat road, f a large truck s tra     then the truck has	evelling at the same speed of a small car,					
a. more kinetic energy.						
b. iess kinetic energy.						
c. the same kinetic energy.						
d. no kinetic energy at all.						
2. Sound and energies are f mobile phone.	rom output energies when operating the					
a. electrical b. potential	c. chemical d. light					
3. We can use the energy obtained to situations, except	rom burning of wood in all of the following					
a. warming houses.	b. operating televis on.					
c. cooking food.	d. boiling water.					
4 When and and water areas on Earlincreases.	arth absorp the solar energy, the					
a. temperature on Earth	b. speed of rotation of Earth					
c. speed of rotation of moon	d. speed of rotation of Sun					
5 When two balls are purchasion of happens as a result of collision of	at the right side.					
a. one ball b. two bals	c. three balls d. four balls					
Write the scientific term of each of						
1 A type of mirrors that is used to d and cook the food inside.	rect sunlight onto metal utens is to heat them (					
2 It is a form of biofuel, that can be made from some types of plants such as grass and wood chips.						
<ol> <li>A turbine that converts the energy energy.</li> </ol>	A turbine that converts the energy of flowing or falling water into electrical					
4. The energy produced from batter	ies. ( )					
5. It is a type of fossil fuel that is produced from dead marine animals						
	()					

## (A) Choose from column (B) what suits it in column (A):

Г	- (A)	(8)
	(A)	a. affects the kinetic energy of the moving object,
1	. The mass of the object	a. affects the kinetic entries potential energy. but doesn't affect its potential energy.
2	. The height of the object	but doesn't affect its postal energies of
	from Earth's surface	b. affects both kinetic and potential energies of
2		the object.
	The speed of a moving	c. when it decreases, the kinetic energy increases
	object	c. when it decreases, which is decreased, which
4	. On Earth's surface	d. wnen it increases, the stored potential energy
		increases.
П		e. the potential energy equals zero.
H		e. the potential officers
		A

(B) Give a reason for the following:

Some calculators use the sunlight to be operated.

## Model Exam (8)

#### Choose the correct answer:

- 1 Some kinetic energy is converted into energy due to friction of bike's tire with the road.
  - a. light.
- b. electrical.
- c. potential.
- d. thermal.
- 2. Using water to generate electricity depends on places ........
  - a. with strong winds.
- b. where dams are built on rivers.
- c. with weak winds.
- d. where boats sail in rivers.
- 3 Inside the electric power station, heating of
- produce steam.

- a. turbines, b. generators. c. water.
- d. fuel.

- 4. Seatbelts work when the car

  - a decreases to speed gradually b increases its speed gradually.
  - c. suddenly stops.
- d, stops gradually.
- While playing guitar, the
- energy changes into sound energy

- a. kinetic.
- b, light.
- c. chemical.
- d. potential.

### Complete the following sentences:

- 1. The wasted energies that are produced from a washing machine are energy and ... ....... energy.
- 2. Dams control the flow of ......, that causes the increase of the energy of water.
- 3. In some villages, so an party larger used to generate energy that is used to operate .... equipment.
- 4. Global warming is a pile in them that raises the . . . of Earth and changes
- 5. As a result of collision between the pall and the bat, the direction of the ball Will

## (A) Give one example for each of the following:

- 1. A renewable resource of energy: .....
- 2. A non-renewable resource of energy
- 3. A method of conserving fossi fuel:
- 4. A disadvantage of using fossil fuel in energy production :
- (B) What happens if ...?

You turn on the T.V.

(according to the change of energy)

## Model Exam (9)

1	C	hoose the correct answer:					
	1	The output energy when playing dr	oums s the	energy			
		a. chemical b light	c. sound	d. potential			
	2	Airbag is fo ded into all the followin	a places in the car.	, except			
		a. steering wheel,	b. dashboard.				
		c. doors,	d. tires.				
	3	When the windmill blades rotates,	this causes wind to	irbines to rotate and			
		generating energy.					
		a. electrical b. solar	c. chemical	d. potential			
	4.	All the following are forms of fossil	fuel, except				
	_	a. water. b. coal.	c. natural gas.	d. OII			
	5.	The factor that affects the kinetic e the same speed, is	nergy of two objec	ts when they move with			
		a. their colors.	b, their sound end	eray.			
		c. their masses.	d. their temperatu				
			a, gron corre				
	Pt	ut (V) or (X) :					
		. Energy may be destroyed inside different devices. (					
		When a cricket bat hits the bail, its		ransfers to the bal (			
	3.	Looking directly at the Sun is very	(				
	on produces potential (						
	5.	The amount of oil on Earth is limited	ed.	( )			
п	(A	) Complete the following sentence	es ·				
	1	The Sun is a star which is mostly made up of gas and gas.					
	2.	When a moving car hits a tree, a page a energy which you hear it	rgy of the Parich <mark>anges into</mark>				
<ul> <li>3. The change of electrical energy into sound energy in the radio is an examinate proves the law of</li> <li>4. The natural resources that can be replaced shortly after being used are cresources of energy.</li> </ul>							
							(B)
		iving fast is very dangerous					

## Model Exam (10)

C	ionse the correct answer:						
1 If an object moves down along a ramp as the angle of inclination of the r increases the speed of the object will							
	a. decrease.	b. increase,					
	c. not change.	d. become zero.					
2	Which of the following is a renewal	ole energy resources ?					
	a. Running bicycle.	b. Running car.					
	c. Running water.	d. Running person.					
3.	Curiosity rover is designed to explore						
	a. Earth planet.	b. Mars planet.					
	c. the Sun.	d. the moon.					
4.	The change of energy in an a wind turbine.	is opposite to the change of a	energy in				
	a. electric bell	b. electric heater					
	c. electric iron	d. electric fan					
5	All the following factors play an impexcept	portant role in the formation of	fossil fuel.				
	a. extreme pressure.	b. extreme heat.					
	c. the moon light.	d. rocks and sediment.					
	Write the scientific term of each of						
1	. The matter that produced theam of	n heating, which is used to turn	1				
	turbines in electric power station.		(				
	. A mill that is turned by water flow.	(					
<u> </u>	. A heavy steel ball that swings on a cable, and is used in destruction of parts of buildings.						
A		(					
	The energy used to play a drum.		()				
J	. The process in which two objects and including an energy transfer.	or more crash into each other,	( + + + + + + + + + + + + + + + + + + +				
1 (	A) Correct the underlined words :		-				
	. The amount of b ofuel that is cons	umed cannot be replaced					
	as quickly as it is used.	(	)				
2	. Dams are built on rivers in order to	o generate solar energy.	(	)			
, , , , , , , , , , , , , , , , , , ,							

- Recommended to the Recommendation of the Rec
- 4 The moving balls of the Newton's grade keep their kinetic energy as time passes.

(B) What happens if ...?

You put your hands near the lighted lamp.

## Contents

Pan

# Guide Answers of Exercises un Lessons

Part

1

Guide Answer of
Exercises on Lessons

(Page

Part

2

Guide Answer of Self-Assessment

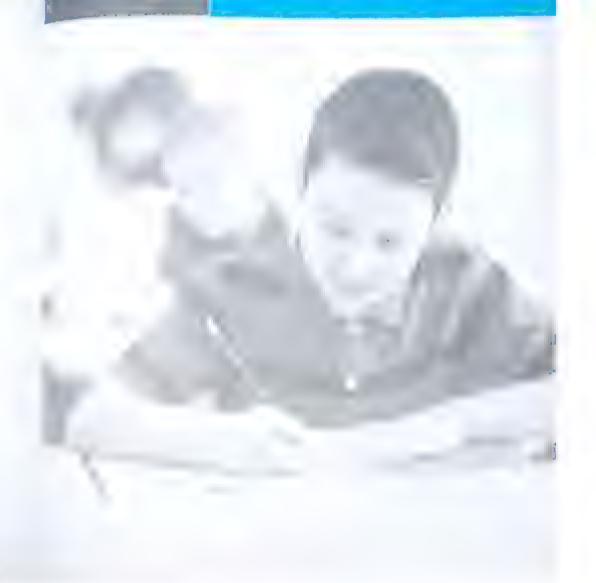
Part

3

Guide Answers of Final Examinations

(Page 28)







## Exemises on Letzun

- 1.d 2.a 3.1
  - 4. b 5. d
- 1. (√) 2. (x) 3. (x) 4. (√)
  - 5. (×) 6. (√)
- 1. Mechanical engineers
  - 2. smaller
  - 3. Decreasing 4. time.
- 1. speed.
  - 2. gasoline climate
  - 3. less
  - 4. distance time speedometer.
  - 5 solar -- electric
- 1 To make solar vehicles drive as fast as the normal vehicle.
  - 2 Because solar vehicle doesn't have speedometer
- It will move with less speed
- 2 hours
  - The speed of solar vehicle
  - = Distance = 100 50 km/ )r

#### Concept (2.4)

### Exercise 1

- 1.c 2.c 3.d 4.b 5.a 6 c 7.b 8.d
- 1,e 2.c 3.d 4
- 3 1 (x) 2 (x) 3. (\sqrt{)} 4. (x)
- 1. Wrecking ball.
  - 2 Seatbelt
  - 3 Airbag
  - 4 Vents
- 1. kinetic energy
- 2, Wrecking ball.
- 3. car
- 4 changes.
- 5. Airbags
- 6. thin nylon
- 7. kinetic energy.
- 1. heavier
  - 2. kinetic increases.
  - 3. seatbelts airbags.
  - 4 change
  - b arbag
  - 6 energy
  - 7 energy
  - 8 seatbelt

#### Because the kinetic energy of the bat transfers to the ball

- 2 Because the seatbelts keep the driver's body and also the passengers from moving forward when the car stops suddenly
- 3 Because the airbags slow the speed of the driver moving forward and they absorb the energy of the car due to its collision
- 1. The kinetic energy of the bat transfers to the ball
  - 2 The energy of collision will push the driver forward strongly that causes many harms to him.
- 1. The car is damaged more than the train. Because the car is slower and lighter than the train and the car has less energy
  - 2. Airbags inflate automatically

## Exercises on Leason (2)

1.b 2.d 3.c 4c 5.a 6.c 7.b

- 1.c 2.a 3.d
- 1. (\*) 2. (\*) 3. (\$\sqrt{}\$) 4. (\*) 5. (\$\sqrt{}\$) 6. (\$\sqrt{}\$)
- 1. Collision.
  - 2. Sound energy.
  - 3 Fuel
- 1. kinetic energy
  - 2 kinetic energy
  - 3 potential energy
- 6 1, collision.
  - 2. kinetic sound
  - 3. kinetic
  - 4. more
  - 5 more
  - 6 Laht sound
  - 1 Because a part of kinetic energy changes into sound energy
  - Because if the speed of the car increases, its kinetic energy increases that results in exerting a large force during an accident.
- 1. The kinetic energy of the car increases.
  - 2. The damage would be much more severe

- 1. The rabbit has the most kinetic energy. Because the speed of rabbit is more than that of tortoise.
  - 2 decrease
- 10 1 c 2.b 3.a

#### Exercises on Lesson

- 1 1 c 2 a 3 a 4 c
- 2 1.a 2.d 3.b
- **3** 1. (**x**) 2. (**x**) 3. (√) 4 x) 5 (√)
- 1. double
  - 2 kinetic energy
  - 3 more
  - 4. kinetic energy
- 1. speed kinetic
  - 2. more
- 3. decrease
- 4. more
- 5. more mass kinetic
- 6. kinetic
- 7. less
- 8 chemical kinetic
- 6 1. Because the truck has mass more than the car
  - 2 Because the car has a smaller engine than the bus.

- Because the truck has
   a bigger mass, than the small
   car
- 1. Its kinetic energy will decrease
  - 2. Its kinetic energy will increase
  - 3. The damage would be much more severe
  - 4. The kinetic energy of the truck is more than that of the small car
- B car truck \_
- 9 1. d 2. b 3. c 4.

### Exercises on Lesson

- 1 1. b 2. d 3. c 4.d
  - **5.** d 6. c
- 2 1. b 2. d 3. a
- 3 1. (√) 2. (√) 3. (×)
  - 4. (x) 5. (x)
- 1 decreases. 2. height
  - 3. a large
- 5 1. increase decrease.
  - 2. kinetic angle of inclination
  - 3. speed kinetic
  - 4. decrease
  - 5. less
- 6. less

- 1. Because the car with mass 3 tons has speed and kinetic energy more than that of the car with mass 1 ton.
  - 2 Because the truck has mass more than that of the car, so the truck has speed and kinetic energy more than that of the car.
  - 3 Because the speed and kinetic energy of a toy car increase by increasing the angle of inclination of the ramp.
- 1. The time that taken to reach the end of ramp will decrease.
  - 2 The speed of the car will increase.
  - 1. Ramp (A). Because the speed of the truck increases by increasing the angle of inclination of the ramp
  - 2 The truck is faster than the car. Because the mass of the truck is more than that of the car, so the speed of the truck is more than that of the car
  - The speed of truck will increase.
- 1. (x) 2. (√) 3. (x) 4. (√) 5. (x)

- Executives on Lesson (5)
- 1.c 2.d 3.b 4.b
  - 5. b 6. b 7. d
- 1.b 2.d 3.c
- 3 1. (x) 2. (√) 3. (√) 4. (x).
- 1, decreases 2, changes
  - 3. equal
  - 4. thermal energy
- 1. potential
  - 2. potential kinetic
  - 3. kinetic
  - 4. kinetic sound
  - 5, kinetic thermal friction
  - 6. friction kinetic
  - 7. potential kinetic
  - 8. kinetic stop
- 1. Because some of the kinetic energy changes into sound energy during collision.
  - 2 Because the energy is conserved during the collision, so it cannot be destroyed.
- 1. It stores potential energy and doesn't have any kinetic energy
  - 2. The potential energy changes into kinetic energy
  - 3 Some of kinetic energy changes into thermal energy.

### PART

- (1) Rise up the first ball, .
  - (2) Potential energy of the first ball decreases
  - (3) Kinetic energy is transferred from the first ball .......
  - (4) Kinetic energy of all balls decreases ...
- 1.c 2.b 3.a

### Exercises on Lesonn (a)

- 1.c 2.d 3.b 4.b 5.c 6.d
- 2 1. (✓) 2. (×) 3. (✓) 4. (×) 5 (✓)
- 3 1. increases.
  - 2. kinetic energy
  - 3. Airbags
- 1. motion
  - 2 photos videos
  - 3. motion stops
  - 4. increases.
- 1. To get more information about the crash without blocking the road.
  - 2. To check their damages accurately

- (A) 1, Time 100
  - 2. Distance 120
  - (B) 1. b
- 2. c
- 1. Photos and videos.
  - The truck causes more damage than the car.

### **UNIT THREE**: Protecting our Planet



### The second of the second

3 C

6 b

- 10 2a
- 1 x) 2 v 1 3 (x, 4 v f (x 6 'v)
- 1 sur. 2 batteries 1 Mars
- 1 Battery
  - 2. Electrical energy
  - 3 Mars rover Curiosity.
- 1, changed
  - 2. chemicai electrical kinetic
  - 3. electrical 4. battery
  - 5 electrical
  - 6. solar electrical
- 1. Because the chemical energy stored in battery is converted into electrical energy in turn changes into kinetic energy that makes the car moves
  - 2 Because sunlight is converted into electrical energy which calculators use it to be operated.
  - Due to the presence of solar panels that use sunlight to recharge its batteries.

- 7 1. We can recharge its batteries by connecting toy car to a nearby charger or replacing old batteries with new ones
  - Solar energy is converted into electrical energy that operate them.
  - It cannot be operated, because it depends on sunlight to be operated.
- 1. (✓) 2 (×) 3. (✓) 4. (×)

### Exercises on Lesson (2

- 1.a 2.b 3.a 4.c 5.d 6.a 7.d 8.c 9 a 10 b
- 1. (\(\sigma\) 2. (\(\mathbb{X}\) 3. (\(\mathbb{X}\) 4. (\(\sigma\) 5. (\(\sigma\) 6. (\(\mathbb{X}\))
  - 4.  $(\checkmark)$  5.  $(\checkmark)$  6. (x) 

     7.  $(\checkmark)$  8. (x) 9. (x)
  - 10 ( </ )
- 3 1. Electrical energy.
  - 2 Electrical energy.
  - 3. The Sun.
  - 4. Thermal energy.
  - 5 Coal.
  - 6. Electrical energy.
  - 7, Chemica, energy.

- 1 electrical
  - 2. potential kinetic
  - 3 kinetic sound
  - 4 kinetic thermal
  - 5 heat
  - 5. light thermal
  - 7. Sun
- 1. Because the potential energy stored in its spring is converted into kinetic energy that moves the soap upward.
  - 2 Because the kinetic energy is converted into thermal energy.
  - 3. Because Some of the energy is lost in the form of heat.
- The electrical energy is converted into sound energy and light energy.
  - 2 The chemical energy is converted into thermal energy and light energy
  - The kinetic energy is sor verted into sound energy
- 7 \* Chemica thermal , ght
  2 Chemica thermal kinetic –
  electrica kinetic sound
- 8 1 c → C 2 c → A 3 a → B

### Exercises on Lesson 🕥

- 1 1.b 2.a 3.d 4.a 5.b 6.d
- 2 1. (√) 2. (×) 3. (√) 4. (x)
- 1. Light energy.
  - The law of conservation of energy.
  - 3. Sound energy.
  - 4. Kinetic energy
- 1. chemical kinetic
  - 2. thermal
  - 3. electrical thermal
  - 4. conservation of energy.
  - 5. created destroyed converted
- 1. Because some of the electr.cal energy is converted into thermal energy.
  - 2 Because battery is the source of energy that is used to operate the toy car.
- You feel warm, because some electrical energy is converted into thermal energy.
- 7 1. chemical electrical
  - 2. electrical light thermal
  - 3 chemical electrical light thermal

### Exercises on Lesson (a)

- 1.a 2.b 3.a 4.d
  - 5.c 6 b 7.a 8.c
- 2 1. (x) 2. (√) 3. (x) 4. (x) 5 (√) 6. (√)
- 3 1. Chemical energy
  - 2. Electrical energy.
  - 3. Thermal energy
  - 4. Kinetic energy.
  - 5. Thermal energy
- 1, light sound thermal
  - 2, electrical thermal kinetic sound
  - 3 sound thermal
  - 4, kinetic
  - 5 electrical light thermal
  - 6. electrical chemical
  - 7. electrical output
  - 8 input output
- Because it doesn't help the mobile phone do its main function.
  - Because it is converted into kinetic, thermal and sound energies.
  - Because they don't help the blender do its main function.

- 6 1. Some energy is wasted as thermal energy
  - 2 The electrical energy is converted into kinetic energy which do the main function of fan and sound and thermal energies as wasted energy.



### Concept 12

### Everanses up Lesson

- 1. d 2. c 3. d
  - 4. c 5. b
- 1.b 2.d 3.c
- [3] 1, (x) 2. (√) 3. (x)
  - 4. (√) 5. (√)
- 4 1, thermal energy
  - 2 Sun
  - 3, thermal energy
- 1. The Sun.
  - 2. Thermal energy.
  - 3 Fuel
- 6 1, thermal kinetic
  - 2. coal natural gas wood.
  - 3. oil natural gas
  - 4. coal wood

- 1 Because fuel burns inside
  the engines to produce the
  thermal energy that is changed
  into kinetic energy which
  causes the different means of
  transportation to move
  - 2 Because the fuel in the car tank runs out
  - 3 To produce thermal energy which changes into kinetic energy which causes the car to move
- 1 The car fuel indicator will go down
  - 2 The car movement decreases gradually until it stops.
- 10 2a 3d

### Exercises on Lesson 2

- 10 1 2 5 3 a 4 5 2 5 7 5 8 5
- 2 c 0 a
- 1 (x) 2. (x) 3. (x) 4. (x) 5 (x) 6. (√) 7. (√)
- 1 a sma 2 wood
  1 a smg 4 me Sur
  2 tam 6 decreased
  7 books 8 Latura gas

- 1 Renewable resources of energy
  - Non-renewable resources of energy
  - 3. Liquid fuel.
  - 4. Fossil fuel
  - 5. Coal
  - 6, oil.
- 1. solar energy renewable natural gas
  - 2. renewable
  - 3. non-renewable
  - 4. biofuel fossil fuel.
  - 5. biofuel charcoal
  - 6. charcoal oil coal
  - 7. liquid
- 7 1. Because they can be replaced shortly after being used
  - 2 Because they are consumed at a rate faster than they can be renewed.
  - Because continuity of cutting down trees leads to deforestation.
- 1 It leads to deforestation, which causes negative effects on the environment
  - 2. They are converted into fossil fuel

- 3 They will form oil and natural gas
- 1.b 2a 3d



- 1 d 2.c 3.b 4.a 1 f t 7 c 2 -9 a 10 d 11 c
- 1. d 2. c 3. a

  3. 1. (✓) 2. (×) 3. (✓)

5 (×)

6. (1)

1. natural gas. 2. heat

4 (X)

- 3. renewable 4. steam 5 ejectrical
- 1. Fossil fuel. 2. Turbine.
- 1. non-renewable
  - 2. renewable waterfalls
  - 3. thermal
  - 4. kinetic electrical
  - 5. steam
  - 6. kinetic generators
  - 7. thermal kinetic
- 1. Because generators convert kinetic energy into electrical energy.
  - 2. To conserve the electricity

- Turbine cannot produce kinetic energy so the generator is not run and don't generate electricity.
  - so the turbine will not run and
- 9 ° c 2 a 3 p 4 d 5 a
- **10** 1 (√) 2. (≭) 3. (√) 4 (≭)
- 11 1) Fuel burns
  - (2) Water secomes hot
  - (3) Steam turns turbines
  - (4) Turbines turn generator
  - 5) Electrical energy sent to houses



- 1 1.d 2.c 3.b 4 a 5.c 6.b 7.a
- 7 1.b 2 c
- 1.(\(\sigma\) 2.(\(\pi\) 3.(\(\sigma\) 4.(\(\pi\))
  - 5. (V) 6 (X) 7. (V)
- 1. Carbonic acid
  - 2. Global warming.
  - 3 Respiratory system.
  - 4. Acid rain

- sorl water
  - 2 air soil water
  - 3 air eyes lungs
  - 4 smog respiratory
  - 5 carbon dioxide water carbonic
  - 6 carbon dioxide air
  - 7 fish
  - 8. carbon dioxide global warming
  - 9 soil acid
- 1 Because the smog of cars cause imitation of human's eyes and lungs
  - 2 Because when pesticides mix with water in canals and rivers during rain falls that lead to pollution of soil and water.
  - 3 Because burning of fossil fuel produces carbon dioxide gas which combines with water in air to form carbonic acid. resulting in acid rain
  - 4. Because burning of coal and oil produce carbon dioxide gas which forms a layer in atmosphere that traps heat above the Earth's surface. causing rise in Earth's temperature that causes global warming

- 5 Because acid rain causes decomposition and dissolving of some rocks including bricks of buildings
- 1. That lead to pollution of soil and water
  - 2. Decreasing the pollution of air. water and soil.
  - 3. Causing decomposition and dissolving of bricks of buildings.
  - 4 Decreasing the amount of carbon dioxide gas
- B 1. c 2. b 3. c

### Exercises on Lessons | 586

- 2. d 3. d 7. C 6. a
- 1. b 2. d 3. a
- 1. (✓) 2. (x) 3. (x) 4. (✓) 5. (x) 6. (x) 7. (\sqrt) 8. (\sqrt)
- 1. non-renewable resources
  - 2. fossil fuel
- 3. pollute
- 4 fossil fuel
- 5. Renewable
- 6. b ofuel
- 7. increase
- 1. Fossil fuel.
  - Global warming.

- 3. Renewable resources of energy
- solar energy wind energy.
  - 2. temperature climate
  - 3. gases heat
  - 4. fossil
  - 5. renewable
  - renewable solar wind.
- 1. Because fossil fuel is formed over millions of years.
  - 2 Because when fossil fuel is burned, it emits gases that cause air pollution.
- Fossil fuel will run out on the Farth
  - 2. The using of renewable resources of energy will not cause an increase in the Earth's temperature.
- Solar energy.
  - 2 Coal
  - 3. Walking or biking instead of driving a car.
  - 4. Air pollution.
  - 5. Not increasing the Earth's temperature.
- 2. b 3. c 4. a

### Exemises on Line

- 2. b
  - 4. h 5. a 6. b
- 2 1. (x) 2. (√) 3. (x) 4 (x)
  - $5. (\checkmark) 6. (\checkmark) 7. (\checkmark)$
- 1 solar 2 water flow 3 Electric

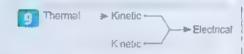
4. low

- 1. Watermit 2 windm1
  - 3 Kinetic energy
  - 4. Non-renewable energy resource
- 1. thermal windmills
  - 2. blaces electrica
  - 3. windmills watermills electricity.
  - 4. electricity.
  - 5. non-renewable renewable
  - 6 renewable non-renewable
- 1 Because they helped them to grind grain to make flour
  - 2. Because solar cars use solar energy which is from renewable energy resources that is low in cost and always available

- 3 Because it is always available in case of presence of wind movement
- 1 Windmills don't move and also don't generate electricity.
  - 2. The solar energy is converted into electrical energy which causes light posts lights up.



Example	Renewable energy resource	Non-renewable energy resource
1.		<b>V</b>
2.	1	
3.		1
4.	1	



### Execusion [2]

- 2. d 3. d 4. a 7. ¢ 6. b 8. a
- 3. d
- 1. (x) 2. (x) 3. (\(\sigma\) 4. (x) 5. (√) 6. (√) 7. (x)

- - 1, the Sun
- 2. light
- 3. Sun
- 4. helrum
- electrical
- - 1. Photosphere, 2. Stars
  - Curved mirrors.
  - 4 Solar panel.
- 1. plants
  - 2 hydrogen helium
  - 3. hard photosphere.
  - 4. light thermal
  - 5. Sun radiant
  - 6. warm
  - 7, mirrors sunlight
  - 8. thermal warm
  - 9 electrical thermal
  - electrical batteries.
  - 11. electrical irrigation
- - Because without sunlight plants will die, and then the animals that eat them will die also.
  - 2. Because the atmosphere absorbs the Sun's energy then land and water absorb this energy, which causes a rise in the Earth's temperature.
  - 3. To capture solar energy (especially radiant energy) coming from the Sun and converts it into electrical energy

- 📆 1. They produce huge amounts of light and heat.
  - 2. Your eyes will be harmed.

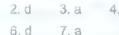


	Used energy Solar	Produced energy
1.	Solar	thermai
2.		E ectrical
3.	Kinetic	Electrical

(10 T) (-)	②(✓)	③ ( <del>-</del> )
4, (√)	(5 (√)	

### Exercises on Lesson





- 2 (\*) 3. (×)
- 4. (X)
- 5. (X)
- $6.(\checkmark)$

- 1. Kinetic
- 2. move
- 3. Wind
- 4. front
- 5. faster
- 6. decreases
- - 1. Wind.
- 2. Windmill
- 3. Electrical energy
- - 1. radiant Sun
  - 2, temperature
  - 3. kinetic

- 4. kinetic electrical
- 5. faster
- 6. faster
- 7. electrical
- 8. increase
- kinetic increase.
- 6 1. Because by decreasing the number of windmill blades it. spins faster and generates more electricity.
  - 2. Because by increasing kinetic energy the blades spin faster and wind turbine generates more electricity.
  - 3. Because when wind blows. from the side the windmill. rotate faster than when wind blows from the front.



- 1. The windmill rotates with high speed.
- 2, Its blades spin faster and generate more electricity.
- 1. Radiant
  - 2. Thermai
  - 3. Kinetic
  - 4. Electrical
  - 5 Kinetic
  - 6. Sound thermal

FART



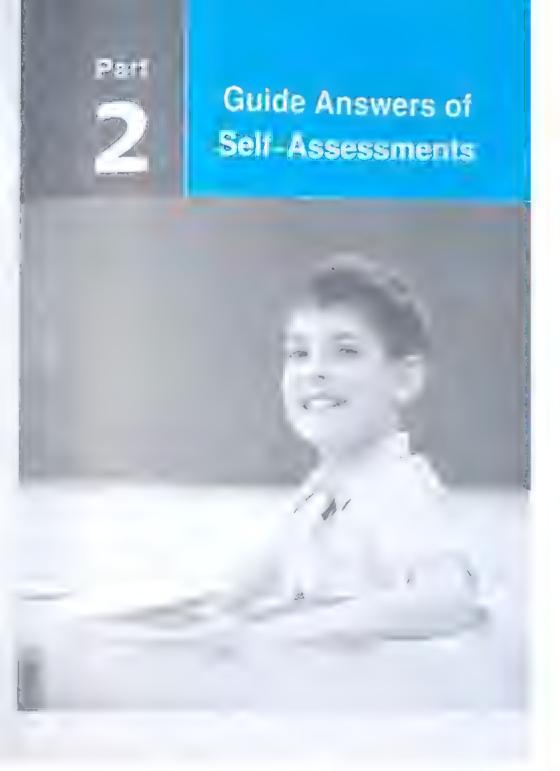
- 1. a
- 3. c
- 4 b 5 a
- 1 (x) 2. (\sqrt) 3. (x) 4. (\sqrt)
- 1 electrical
- 2. gravitational
- 3 electrical
- 4. water
- 4 1, Water turbine.
  - Hydroelectric energy.
- 1 gravitational potential kmetic
  - 2. dams potential electrical
  - 3 water potential
  - 4. hydroelectric energy.
  - 5, wind kinetic electricity.
  - 6 turbine
  - 7 dams
- To control the water flow and increase the potential energy of water to generate electricity.
  - 2 Because the flow of falling water helps water turbines rotate and generate electricity
- 1. Potential energy of water in dams is converted into kinetic energy which causes water turbines rotate and generate electricity.

- It converts into more kinetic energy which causes water turbines spin faster and generate more electricity.
- 1. Potential
- 2. Kinetic
- 3. Electrical
- 4. Light sound
- 5. Thermal

### Exercises on Lessons LA



- 1. d 2.
- 4 5 5 6
- 1. (\*) 2. (√) 3 (×) 4. (√)
- 1. Water turbine.
  - 2. Evaporation.
  - 3. Water cycle
- 1, Sun wind water
  - 2. turbines
  - 3. kinetic electrical
  - 4. evaporation condensation
  - 5. kinetic hydroelectric
- Because kinetic energy of moving water in dams is used to rotate water turbines to generate hydroelectric energy.
- Clouds are formed
- **7** 1. (3) 2. (1) 3. (4) 4. (2)



# 12



### Sand and I I

- (A) 1. d 2. c 3. d
  - (B) To make the driver can get out of the car
- (A) 1. (🗸) 2 (🗸) 3. (\*)

  (B) The airbags will inflate and fill
- kinetic different

with a gas.

### Self-Assessment 2

- (A) 1. b 2. a 3. c
  - (B) Because the speed of the rabbit is more than that of tortoise
- (A) 1. (★) 2. (★) 3. (√)
  (B) Its kinetic energy will increase.
- 3 c 2 b 3.c 4.b

### Self-Assessment 3

- (A) 1. c 2. c 3. d
  - (B) Because the venicle with the large mass has kinetic energy more than that of the vehicle with the small mass, so it causes more damage.

- (A) 1. (★) 2. (✔) 3. (✔)
  (B) Its kinetic energy will increase
- 1 b 2.a 3 c

### Sellen: sessment 4

- (A) 1. d 2. a 3. c
  - (8) Because the speed of the object that moves down a ramp increases by increasing the angle of inclination of the ramp.
- (A) 1. (★) 2. (✓) 3. (✓)

  (B) Its kinetic energy will increase
- 3 1.b 2 d 3.a 4.b

### Self-Assessment (5)

- (A) 1. c 2. d 3.
  - (B) Because some of kinetic energy of balls changes into sound energy.
- 2 (A) 1. (x) 2. (\sqrt) 3. (\sqrt)
  - (B) Their kinetic energy will decrease gradually until they stop.
- 3 1. b 2. d

### Self-Assessment b

- (A) 1, d 2, b 3, c
  - (B) Because the traffic cameras provide the crash investigators with photos and videos to get more information about the accident without blocking the road.
- A 1,×, 2(v, 3(×,
  - (B) 1. Take measurements from the scene of the accident.
    - 2. Collecting data.
- The truck is the main reason that causes this accident.

  Because the speed of the truck is more than the speed of the road that shown by the traffic sign post.

### Model Exam on Concept (2.4)

- (A) 1. d 2. c 3. a 4.
  - (8) Because the kinetic energy of the bat is transferred to the ball.
- 2. (×) 3. (√) 2. (×) 4. (√)
  - (B) The damage would be much more severe

- (A) 1. kinetic energy
  - 2. height
  - 3. equal
  - 4 increases
  - (B) (1) Rise up the first ball. .......
    - (2) Potential energy of the first ball .......
    - (3) Kinetic energy is transferred from the first
    - (4) Kinetic energy of all balls decreases .
- (A) 1. Wrecking ball.
  - 2. Collision.
  - 3 Vents
  - 4. Sound energy
  - (B) The car causes less damage.

### UNIT THREE: Protecting our Planet

### Consign (1.1)

### Tarif La sea same in

- 1 (A) 1, (x) 2, (√) 3, (x)
  - (B) Because it contains solar panels that convert solar energy into electrical energy which is used to charge the robot's batteries.
- (A) 1. The Sun.
  - 2. Chemical energy
  - 3. Mars rover Curiosity.
  - (B) 1 Remot Controlled toy car.
    - 2. Mars rover Curiosity
- 2. c

### Salak providence (1)

- (A) 1. kinetic thermal 2. kinetic - thermal
  - 3. thermal kinetic
  - (B) Because it is converted into kinetic energy which is used to operate certain equipment in electric power stations.
- 2 (A) 1. (x) 2. (x) 3. (√)

22

(B) The potential energy is converted into kinetic energy that moves the soap upward.

- 1 solar chemical
  - 3. chemical 2. thermal
  - 4 electrical

### Serf-Assessment (9

- (A) 1, a 3. b 2. c
  - (B) The kinetic energy is converted into thermal energy
- (A) 1, conservation 2. chemical 3. thermal
  - (B) 1, Blender.
    - 2. Washing machine
- 1.2-3-4 2.3 - 4

### All Assessment 10

- (A) 1. thermal kinetic
  - 2. kinetic input
  - 3. chemical electrical
  - (B) Because they don't help the washing machine do its main function.
- (A) 1. Electrical energy
  - 2. Thermal energy.
  - 3. Kinetic energy
  - (B) 1. Electrical energy.
    - 2. Thermal energy.
- 3 1. (2) 2.(1)-(3)3.(1)-(3)
  - 4 electrical electric power

### time Exam on Concert 3 1

- (A) 1, b 2, c 3, a 4, d
  - (R) You feel warm because some electrical energy is converted into thermal energy
- (A) 1. (√)
  2. (×) 3. (X) 4. (1) (B)  $2 \longrightarrow 4 \longrightarrow 1 \longrightarrow 3 \longrightarrow 5$
- (A) 1, Chemical 2, batteries 3. sound 4 Sun
  - (B) Because the potential energy stored in its spring is converted into kinetic energy that moves the soap upward
- (A) 1. Electrical energy.
  - 2. The law of conservation of energy.
  - 3. Thermal energy.
  - 4. Sound energy.
  - (B) 1, b ---- C
    - 2 c----A
    - 3. a --- B

## Commercial (Section 2)

### Self-Assessment (1)

- (A) 1. c 2. c
  - (B) They are used as a source of thermal energy for cooking food and warming homes.

- 2 (A) 1. (x) 2 (V, 3 (V)
  - (B) Wood
    - Coal
    - Natural gas.
- 1. Gasoline. 2. Wood
  - 3. Thermal energy.
  - 4 The Sun.

- (A) 1. d
  - (8) Because biofuel can be replaced shortly after use.
- (A) 1. (√) 2. (x) 3. (x)
  - (B) Marine organisms will be decomposed into petroleum
- 2. c 3 d 4 a

### Self-Assassman

- (A) 1. c 2. b
  - (B) The electric generator cannot convert the kinetic energy into electrical energy.
- A) 1 (x) 2 x) 3 ,v
  - (B) 1. non-renewable
    - 2. steam.
    - 3. cables.
  - 1. Turbine. 2. Generator.

    - 3. Coal. 4. Steam.

### Self-Assessment (14)

- (A) 1. b 2. b 3. c
  - (B) Because burning of coal and oil produce carbon dioxide gas which forms a layer in atmosphere that traps heat above the Earth's surface causing the increase of Earth's temperature.
- (A) 1. (★) 2. (★) 3. (✔)
  - (B) People will suffer from irritation of their eyes and lungs.
- 3 1. b 2. c 3. a

### Self-Assessment 15

- (A) 1, c 2, b 3, d
  - (B) Because when fossil fuel burn, they emit gases that trap heat in the atmosphere, so the temperature of the Earth increases and changes its climate.
- 2 (A) 1. (✓) 2. (×) 3. (✓)
  - (B) The Earth's temperature will increase.

global warming ......

### Model Exam on Concept (3.2)

- (A) 1. wood coal natural gas.
  - 2. kinetic electrical
  - 3. renewable
  - 4. biofuel fossil fuel.
  - (B) 1. d 2. c 3. a
- (A) 1. thermal energy
  - 2. biofuel
- 3. electricity
- 4. pollute
- (B) Using renewable resources will not cause an increase in Earth's temperature.
- 3 (A) 1. (X) 2. (\(\sigma\))
  3. (\(\sigma\))
  4. (X)
  - (B) (1) Fuel burns ......
    - (2) Water becomes hot
    - (3) Steam turns turbines .....
    - (4) Turbines turn generator
    - (5) Electrical energy sent to .......
- (A) 1. b 2. d 3. c 4. d
  - (8) Because the continuity of cutting trees leads to deforestation.

### Concept (3.3)

### Self-Assessment 16

- (A) 1. c 2. b 3. d
  (B) To generate electricity,
- [2] (A) 1. (×) 2. (×) 3. (√)
  - (B) Watermills don't move, so they don't generate electricity.
- 1. solar panel Sun.
  - 2. renewable
  - 3. light thermal

### Self-Assessment 1

- 11 (A) 1. d 2. c 3. a
  - (B) Because the rays of the Sun are very strong and can harm your eyes.
- (A) 1 non-renewable
  - 2. curved
  - 3. electrical
  - (B) It is converted into heat that warms the interior of the greenhouses to allow farmers to plant crops that grow in warm climates.
- 3 1. greenhouse.
  - 2. radiant
  - 3. thermal
  - 4. warm

### Self-Assessment (18)

- (A) 1. solar panels wind 2. blades
  - 3. renewable
  - (8) Because they convert radiant energy coming from the Sun into thermal energy that warms the inside of greenhouses.
- 2 (A) 1. (x) 2. (√) 3. (x)
  - (B) Windmill spins slower and generates less electricity.
- Windmill (B), Because it has less number of blades than windmill (A).
  - 2. Windmill (A).

### Self-Assessment (19)

- 1 (A) 1. a 2. c 3. d
  - (B) Because the flow of water in dams through water turbines help them rotate and generate electricity.
- (A) 1. Dam. 2. Greenhouse.
  - Hydroelectric energy.
  - (B) 1. Light posts From solar energy to electrical energy then light energy.
    - Calculators From solar energy to electrical energy.

3 1. (\(\sigma\) 2. (\(\sigma\) 3. (\(\pi\) 4. (\(\sigma\)

### Self-Assessment [20]

- (A) 1, water 2, side 3. thermal
  - (B) Wind turbine spins faster and generate more electricity.
- (A) 1. Coal. 2. Hand mixer. 3. Windmill.

(B)

P.O.C	Water turbines	Solar panels
1. Source of energy that is used to operate it:	Water	The Sun
2. The produced energy:	Electrical energy.	Electrical energy and thermal energy.

3 1. (√) 2. (x) 3. (√) 4. (x)

### Model Exam on Concept (3.3)

- (A) 1. Kinetic energy.
  - 2. The stars.
  - 3. Windmill.
  - 4. Water turbine.
  - (B) To control the water flow and increase the potential energy of water to generate electricity.

- (A) 1. light
- 2. faster
- 3. solar
- 4. gravitational
- (B) Your eyes will be harmed.
- (A) 1. (√)
  - 3. (1)
- 2. (1) 4. (X)
- (B) 1. Potential
  - 2. Kinetic
  - 3. Electrical
  - 4. Light sound
  - 5. Thermal
- 4 (A) 1. b
- 2. c
- 3. c
- 4. a

(B)

	Used energy	Produced energy
1.	Solar energy.	Light energy and thermal energy.
2.	Kinetic energy.	Electrical energy
3.	Kinetic energy	Electrical energy.

### Model Exam on Theme (3)

- (A) 1. chemical electrical kinetic
  - 2. kinetic thermal
  - 3. oil natural gas
  - 4. hard photosphere.
  - (B) 1. (-) 2. (√) 3. (-)
- 4. (1) 5. (1)

- (A) 1. (3c) 2. (1) 3. (1) 4. (1)
  - (B) Because generators convert kinetic energy into electrical energy.
- (A) 1. Solar panel.
  - 2. Fuel.
  - 3. Mars rover Curiosity.
  - 4. Kinetic energy.
  - (8) The car movement decreases gradually until it stops.
- (A) 1. The Sun
  - 2. Electric
  - 3. heat.
  - 4. biofue
  - (B) 1. b 2. c 3. d

27

### Part

3

# **Guide Answers of Final Examinations**



# PART 3

### **Model Exams**

### Model Exam 1

- 1 1. d 2. b
- 3. d
- . a 5. c
- 2. (\*) 2. (\*) 3. (\*) 4. (\$\sqrt{}\$) 5, (\$\sqrt{}\$)
- 3 (A) 1. Electric bulb.
  - Renewable resources of energy.
  - 3. Wind.
  - 4. Electrical energy.
  - (B) To conserve the electricity.

### Model Exam 2

- 1. 1. a 2. a 3. 4. b 5. b
- 2 1. potential kinetic
  - windmills watermills electricity.
  - 3, heat,
  - 4. charcoal oil coal
  - 5. chemical kinetic
- 3 (A) 1. (✓) 2. (×) 3. (✓) 4. (×)
  - (B) The energy of collision will push the driver forward strongly that causes many harms to him.

### Model Exam 3

- 1 1.c 2.a 3.d
- 1. kinetic energy.
  - 2. Mars.
  - 3. renewable
  - 4. electrical
  - 5. batteries
- (A) 1. e 2. c 3. d 4 a
  - (B) Because fossil fuel is formed over millions of years.

### Model Exam 4

- 11 1. b 2. a 3. b
  - 4. b 5. a
- 2 1. Evaporation.
  - 2. Gasoline.
  - 3. Fossil fuel.
  - 4. Electric bulb.
  - 5. Thermal energy.
- (A) 1. Solar thermal 2. Kinetic – Electrical
  - (B) We can recharge its batteries by connecting toy car to a nearby charger or replacing old batteries with new ones.

29

### Model Exam 5

- 11 c 2 c 3 d
- 2 1.(x) 2.(√) 3.(√) 4 (x) 5.(√)
- (A) 1. warm.
  - 2 changed
  - 3. collision.
  - 4. increase decrease.
  - (B) Because without sunlight plants will die, and then the animals that eat them will die also.

### Model Exam 6

- 1 1. d 2. b 3, d 4, a 5, b
- 2 1. kinetic
  - 2. water flow.
  - 3 Sun
  - 4. solar
  - 5 natural gas.
- (A) 1. Chemical Thermal light
  2. Chemical Thermal –
  Kinetic Electric Kinetic
   Sound
  - (8) The damage would be much more severe.

### Model Exam 7

- 1 1.a 2.d 3.b 4.a 5.b
- 7 1. Curved miπors.
  - 2. Liquid fuel.
  - 3. Water turbine.
  - 4. Electrical energy.
  - 5. oil.
- (A) 1. b 2. d 3. a 4. e
  - (B) Because sunlight is converted into electrical energy which calculators use it to be operated.

### Model Exam 8

- 1 1.d 2.b 3.c
- 2 1. sound thermal
  - 2. water potential
  - 3. electrical irrigation
  - 4. temperature climate.
  - 5. change.
- (A) 1. The Sun.
  - 2. Coal.
  - 3. walking or biking instead of driving a car.
  - 4. Air pollution.
  - (B) The electrical energy is converted into sound energy and light energy.

### Model Exam 9

- 1.c 2.d 3,a 4.a 5.c
- 1. (x) 2. (x) 3. (\sqrt)
  4. (x) 5. (\sqrt)
- (A) 1. hydrogen helium
  - 2 kinetic sound
  - 3. conservation of energy.
  - 4. renewable
  - (B) Because by increasing the speed of the car, its kinetic energy increases, which increases the harms if an accident occurs.

### Model Exam 10

- 1.b 2.c 3.b 4.d 5.c
- 1. Water.
  - 2. Watermill.
  - 3. Wrecking ball.
  - 4. Kinetic energy.
  - 5. Collision.
- (A) 1. fossil fuel
  - 2. electrical
  - 3. height
  - 4. decrease
  - (B) You feel warm, because some electrical energy is converted into thermal energy.